MITSUBISHI ELECTRIC

SPLIT-TYPE AIR CONDITIONERS

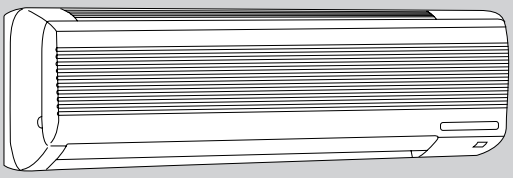
No. OB273

HFC utilized R407C

SERVICE MANUAL

Wireless type Models

MS-C18TV -E1 (WH) · MU-C18TV -E1
MS-C24TV -E1 (WH) · MU-C24TV -E1



MS-C18TV -E1
MS-C24TV -E1

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1 TECHNICAL CHANGES

INFORMATION FOR THE AIR CONDITIONER WITH R-407C REFRIGERANT

This room air conditioner adopts HFC refrigerant (R407C) which will never destroy the ozone layer.
Pay attention to following points.

① Take sufficient care not to allow water and other contaminations to enter the R407C refrigerant during storage and installation, since it is more susceptible to contaminations than HCFC (R22) refrigerant.

② Clean refrigerant pipings should be used.

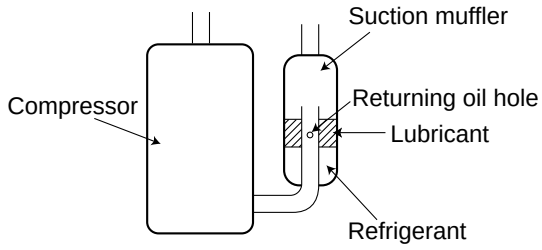
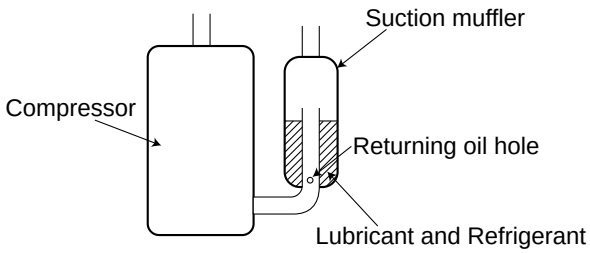
③ Composition change may occur in R407C since it is a mixed refrigerant. When charging, charge liquid refrigerant to prevent composition change.

④ Be especially careful when managing the tools.
If dust, dirt, or water mixes in the refrigerant cycle, it may cause decrease of performance.

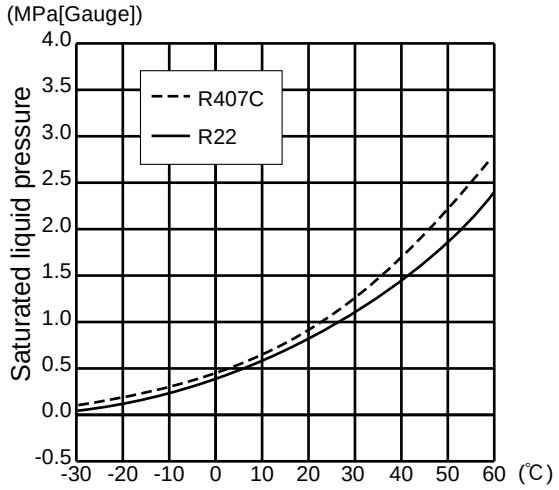
		New refrigerant	Previous refrigerant
Refrigerant	Refrigerant	R407C	R22
	Composition (Ratio)	R32: R125: R134a (23%:25%:52%)	HCFC22 (100%)
	Refrigerant handling	Non-azeotropic refrigerant	Single refrigerant
	Chlorine	Not included	Included
	Safety group (ASHRAE)	A1/A1	A1
	Molecular weight	86.2	86.5
	Boiling point (℃)	-43.6	-40.8
	Steam pressure [25℃](Mpa [Gauge])	0.9177	0.94
	Saturated steam density [25℃](Kg/m³)	42.5	44.4
	Combustibility	Non combustible	Non combustible
	ODP ※1	0	0.055
	GWP ※2	1530	1700
	Refrigerant charge method	From liquid phase in cylinder	Gas phase
	Additional charge on leakage	Impossible	Possible
Lubricant	Kind	Incompatible oil	Compatible oil
	Color	Non	Light yellow
	Smell	Non	Non

※1 :Ozone Destruction Parameter : based on CFC11

※2 :Global Warmth Parameter : based on CO_2

	New Specification	Previous Specification
Compressor	The incompatible lubricant easily separates from refrigerant and makes the layer in the upper inside the suction muffler. The higher position of the returning oil hole enables to return the lubricant of the upper layer to the compressor. 	Since refrigerant and lubricant are compatible each other, lubricant returns to the compressor through the lower position returning oil hole. 

Conversion chart of refrigerant temperature and pressure



NOTE : The unit of pressure has been changed to MPa on the international system of units(SI unit system).

The conversion factor is: **1(MPa[Gauge]) =10.2(kgf/㎠[Gauge])**

1.Tools dedicated for the air conditioner with R407C refrigerant

The following tools are required for R407C refrigerant. Some R22 tools can be substituted for R407C tools.
Do not use tools that are used with R22 refrigerant in order to avoid mixing oils.

R407C tools	Can R22 tools be used?	Description
Gauge manifold	No	A gauge manifold with a sight glass is recommended for charging the liquid refregerant.
Charge hose	No	Hose material have been changed to improve the pressure resistance.
Gas leak detector	No	Dedicated for HFC refrigerant.
Torque wrench	Yes	———
Flare tool	Yes	———
Vacuum pump adapter	New	Provided to prevent the back flow of oil. This adapter enables you to use existing vacuum pumps.
Electronic scale for refrigerant charging	New	Use the electronic control scale for measuring the R407C.

2.Refrigerant piping

Do not use copper pipes which are broken, deformed or discoloured.
In addition, be sure that the inner surfaces of the pipes are clean, free of hazardous sulfur and oxides, or have no dust/ dirt, shaving particles, oil, moisture or any other contamination.
•If there is a large amount of residual oil inside the piping and joints, deterioration of the refrigerant oil will result.

3.Refrigerant oil

Apply the specific refrigeration oil (accessories) to the flare and the union seat surfaces.

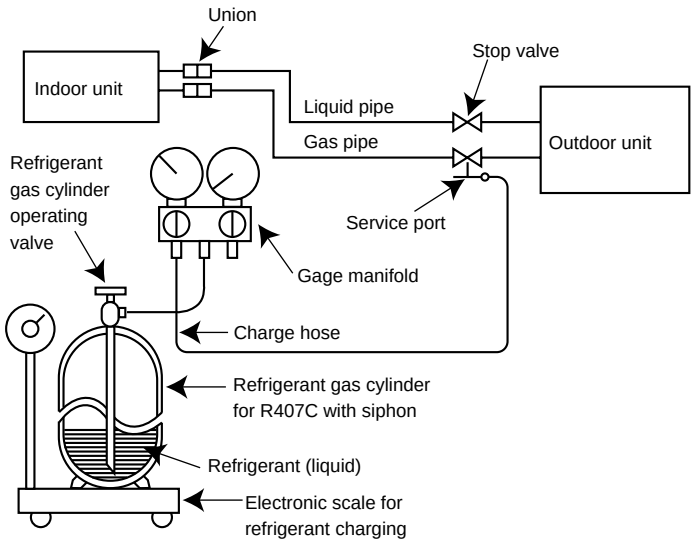
4.Air purge

Use the vacuum pump for air purge to protect environments, and to avoid changing the composition of refrigerant.

5.Additional charge

For additional charging, charge the refrigerant with liquid phase slowly using a gas cylinder. If the refrigerant is charged with gas phase, the composition of refrigerant will change. In this case, ability of the refrigerating cycle decreases or normal operation can be impossible.
If liquid refrigerant is rapidly charged at once, the compressor may be locked.

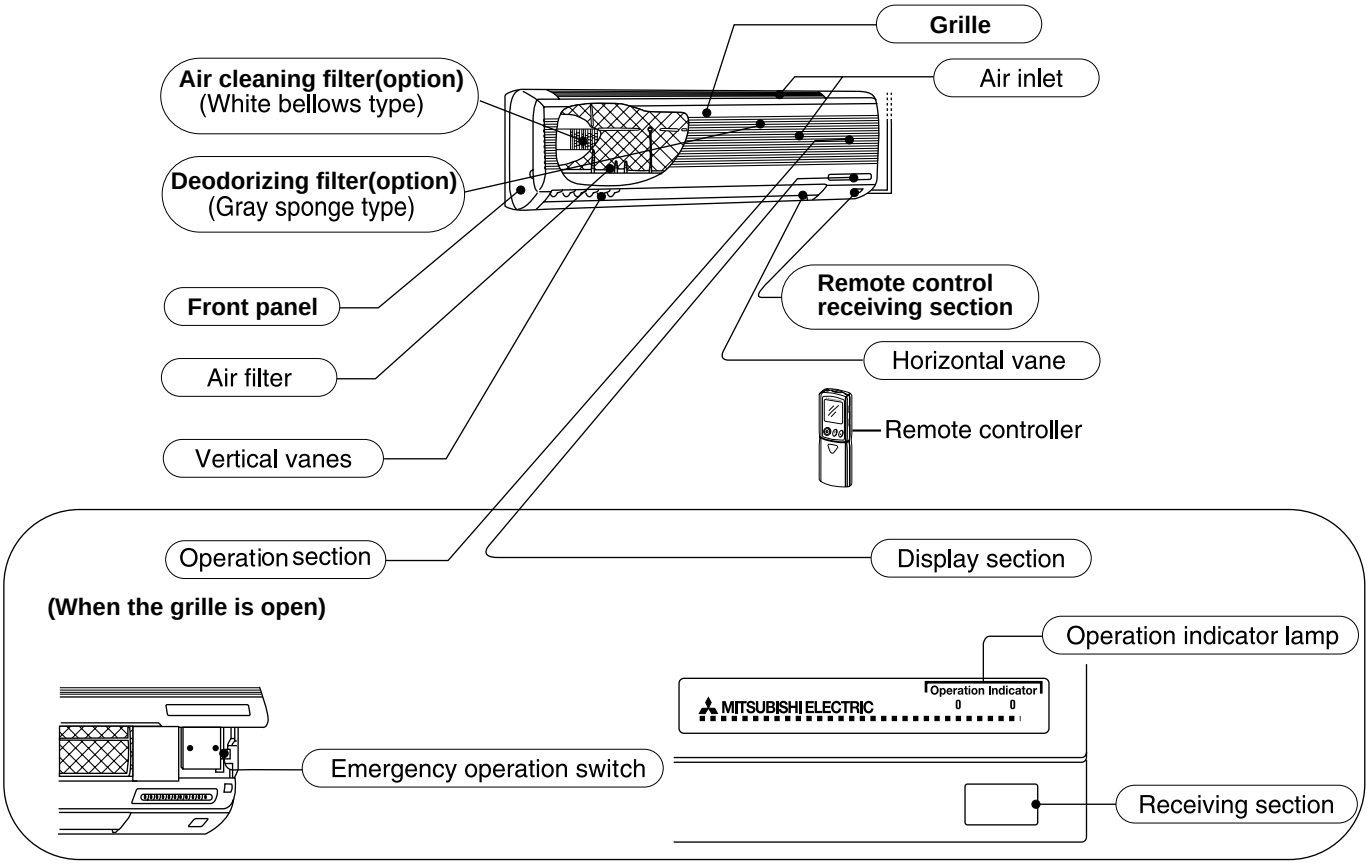
NOTE: 1. The R407C is mixed refrigerant which consist of three different kinds of evaporative temperature. As a result, the R407C occurs the change of composition.
2. Additional refrigerant charge has been changed by change of refrigerant.(R22 ➔ R407C)
R22 : <MU-type> 15g/m ➔ R407C : <MU-C18/C24TV> 20g/m



2 PART NAMES AND FUNCTIONS

INDOOR UNIT

MS-C18TV -E1
MS-C24TV -E1



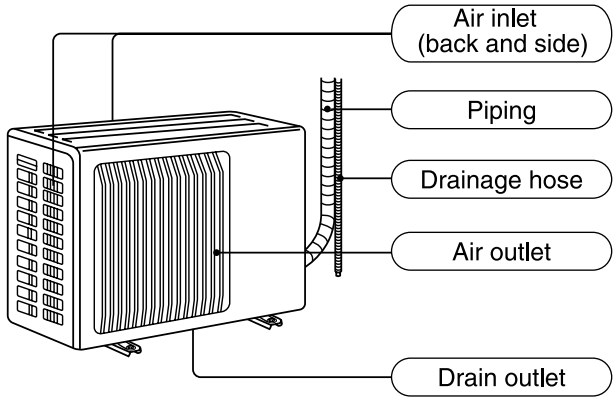
ACCESSORIES

MS-C18TV -E1
MS-C24TV -E1

①	Installation plate	1
②	Installation plate fixing screw 4 x 25 mm	5
③	Remote controller mounting hardware	1
④	Fixing screw for ③ 3.5 x 16 mm (Black)	2
⑤	Battery (AAA) for remote controller	2
⑥	Wireless remote controller	1
⑦	Felt tape (Used for left or left-rear piping)	1
⑧	Refrigeration oil	1

OUTDOOR UNIT

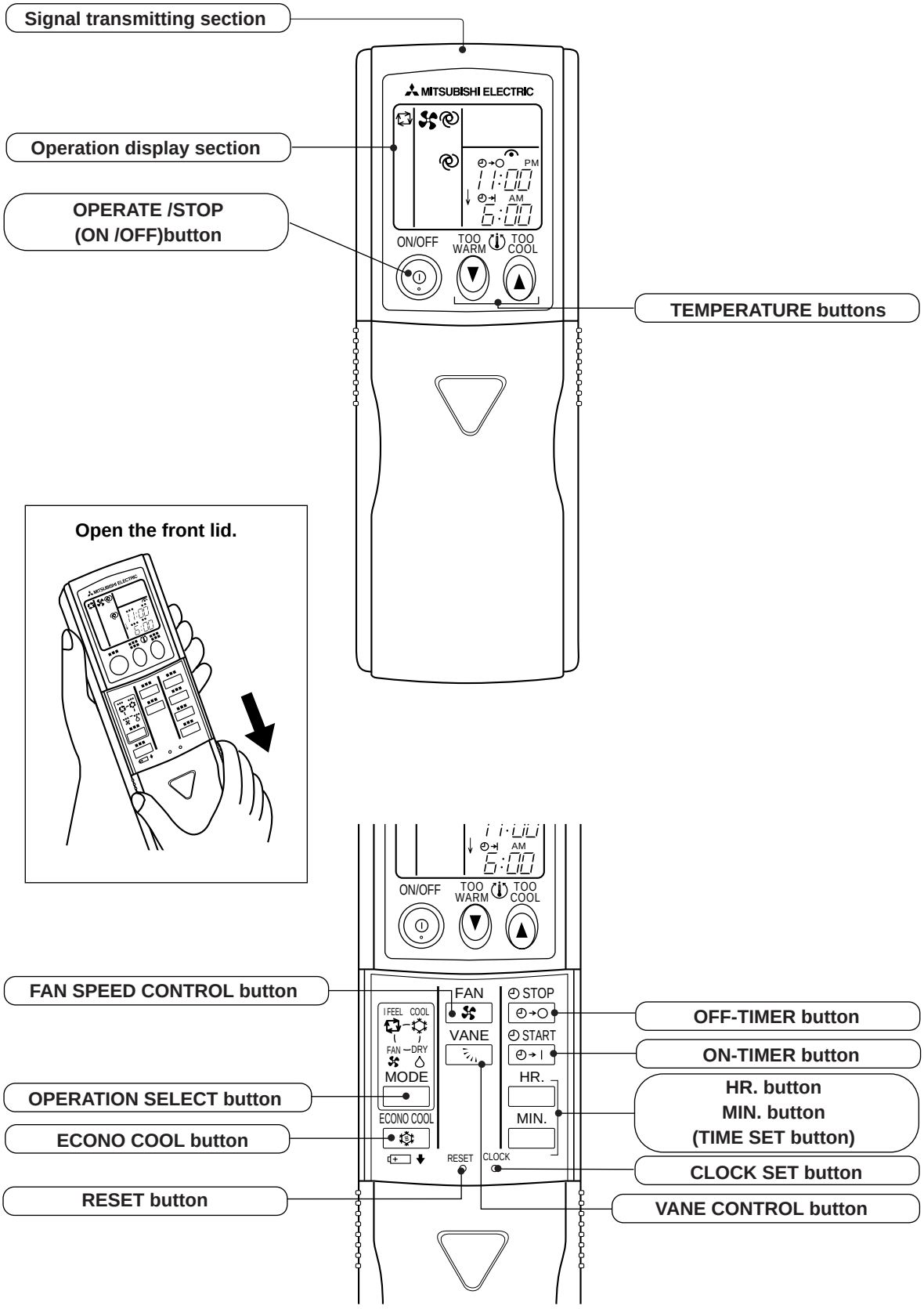
MU-C18TV -E1
MU-C24TV -E1



REMOTE CONTROLLER

MS-C18TV - E1

MS-C24TV - E1



3 SPECIFICATION

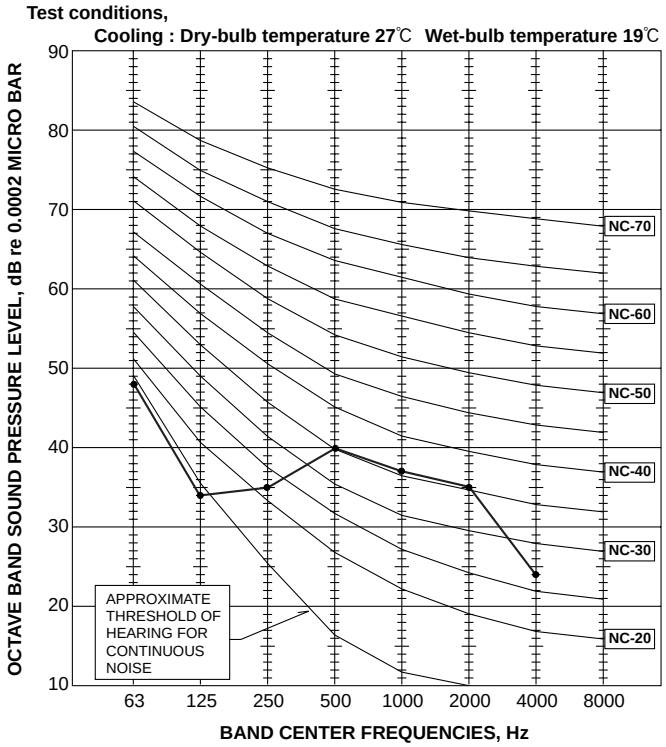
Indoor model			**MS-C18TV -** E1	**MS-C24TV -** E1
Function			Cooling	Cooling
Power supply			Single phase 230V, 50Hz	Single phase 230V, 50Hz
Capacity	Capacity	kW	5.1	6.4
	Dehumidification	ℓ /h	2.4	3.1
	Air flow(High)	m³ /h	756	816
Electrical data	Power outlet	A	15	25
	Running current	A	9.3	12.7
	Power input	W	2,100	2,840
	Auxiliary heater	A(kW)	—	—
	Power factor	%	98	97
	Starting current	A	50	84
	Fan motor current	A	0.25	0.29
Coefficient of performance(C.O.P)			2.43	2.25
Fan motor	Model		RA4V27-EF	RA4V27-EE
	Winding resistance(at20℃)	Ω	WHT-BLK 183.8 BLK-RED 250.5	WHT-BLK 183.8 BLK-RED 250.5
	Dimensions W×H×D	mm	1,015×320×190	1,015×320×190
	Weight	kg	14	14
Special remarks	Air direction		5	5
	Sound level (High)	dB	42	45
	Fan speed (High)	rpm	1,180	1,260
	Fan speed regulator		3	3
	Thermistor RT11(at25℃)	kΩ	10	10
	Thermistor RT12(at25℃)	kΩ	10	10
Outdoor model			**MU-C18TV -** E1	**MU-C24TV -** E1
Capacity	Air flow	m³ /h	2370	2322
Electrical data	Compressor motor current	A	8.66	11.86
	Fan motor current	A	0.39	0.55
Compressor	Model		PE-33VPEHT	NE-47VMHHT
	Output	W	1,500	2,200
	Winding resistance(at20℃)	Ω	C-R 1.08 C-S 2.18	C-R 0.67 C-S 2.02
Fan motor	Model		RA6V50-OG	RA6V60-AC
	Winding resistance(at20℃)	Ω	WHT-BLK 116.4 BLK-RED 111.0	WHT-BLK 81.1 BLK-RED 102.2 BLK-YLW 92.2
	Dimensions W×H×D	mm	850×605×290	850×605×290
	Weight	kg	48	61
Special remarks	Sound level(High)	dB	52	53
	Fan speed(High)	rpm	845	873
	Fan speed regulator		1	2
	Refrigerant filling capacity(R407C)	kg	1.10	1.85
	Refrigerating oil (Model)	cc	1100 (NEO22)	1400 (NEO22)

NOTE: Test conditions are based on JIS C 9612.
Cooling : Indoor DB 27°C / WB 19°C
Outdoor DB 35°C / WB 24°C

4 NOISE CRITERIA CURVES

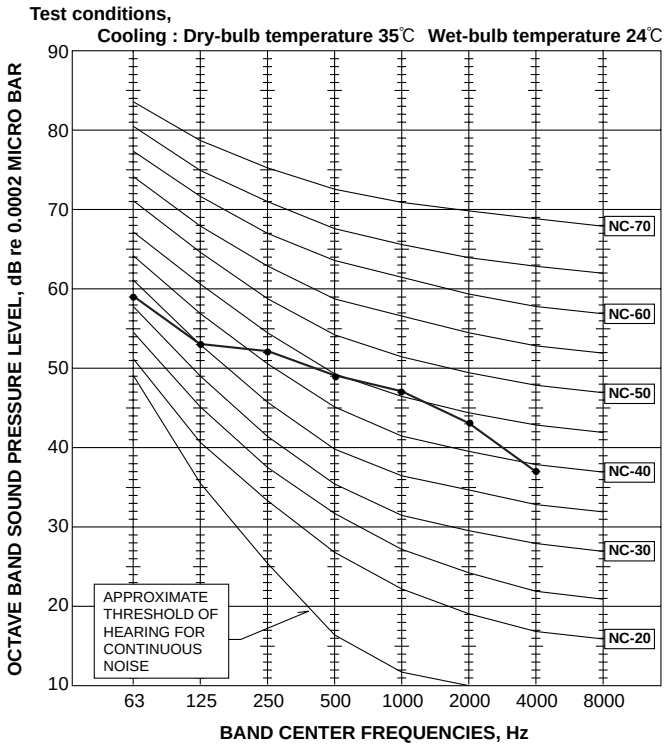
MS-C18TV - E1

NOTCH	SPL(dB(A))	LINE
High	42	●——●



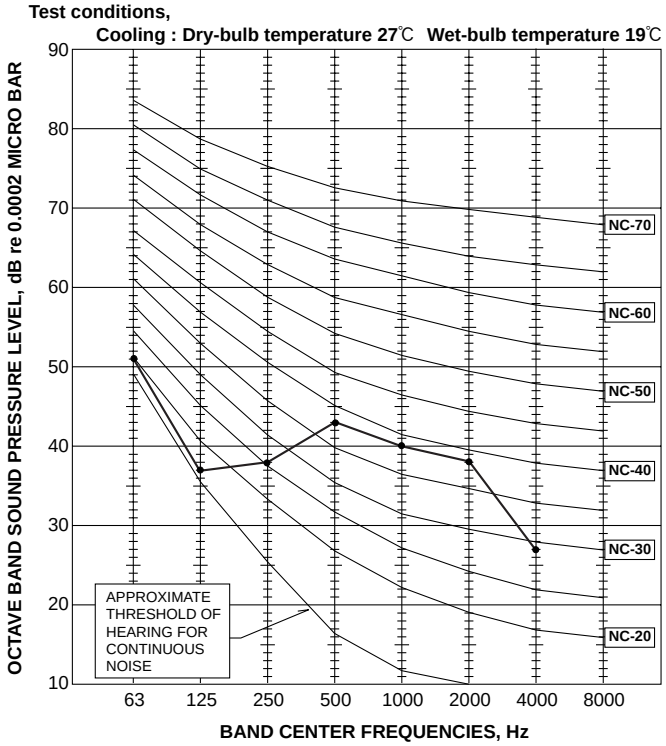
MU-C18TV - E1

NOTCH	SPL(dB(A))	LINE
High	52	●——●



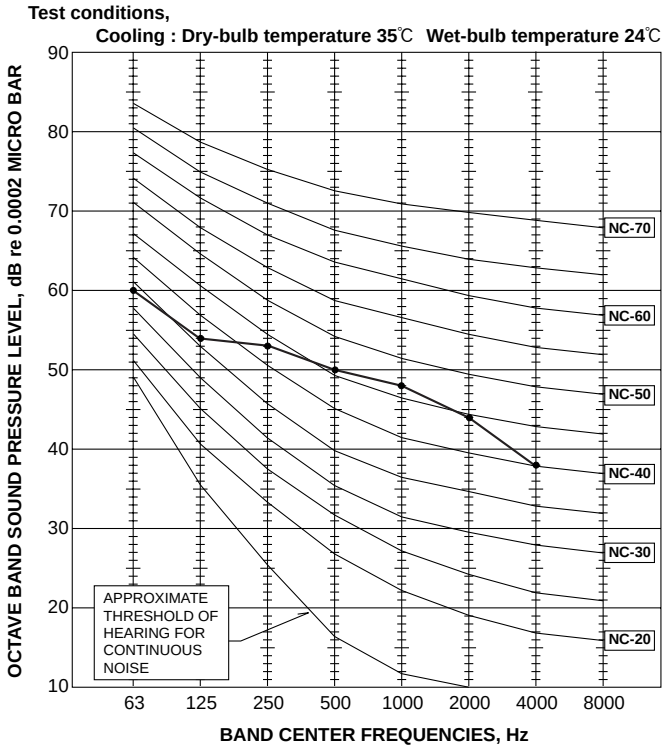
MS-C24TV - E1

NOTCH	SPL(dB(A))	LINE
High	45	●——●



MU-C24TV - E1

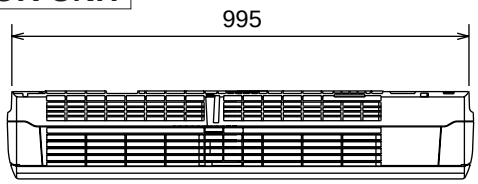
NOTCH	SPL(dB(A))	LINE
High	53	●——●

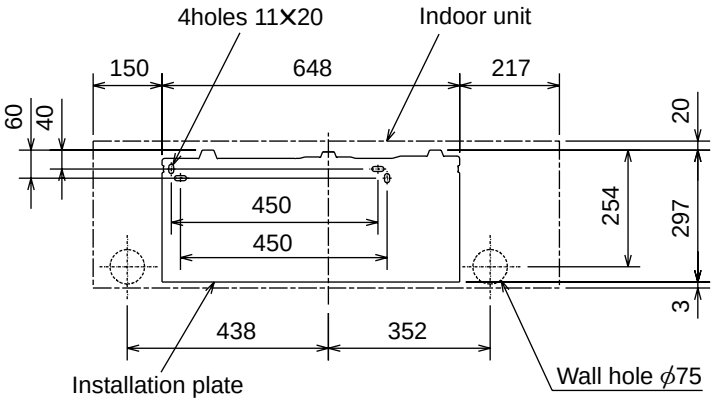


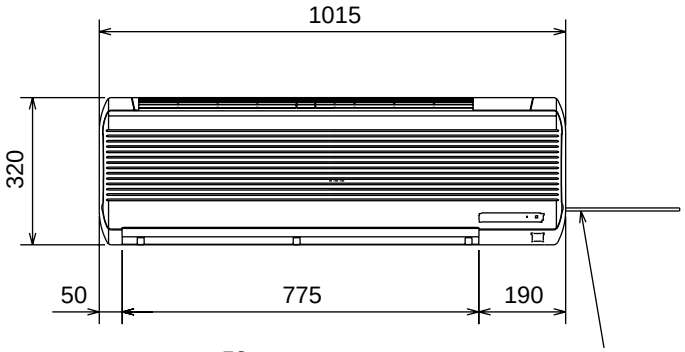
5 OUTLINES AND DIMENSIONS

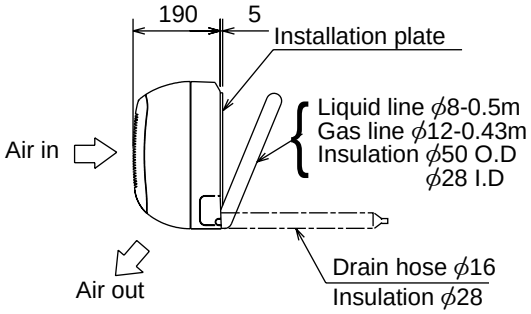
Unit : mm

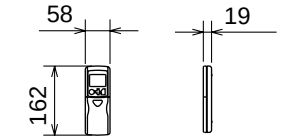
MS-C18TV -E1
MS-C24TV -E1
INDOOR UNIT



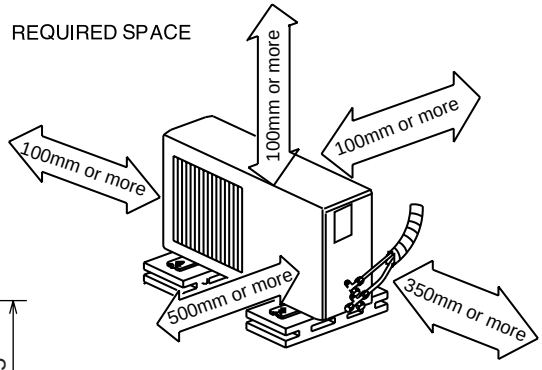


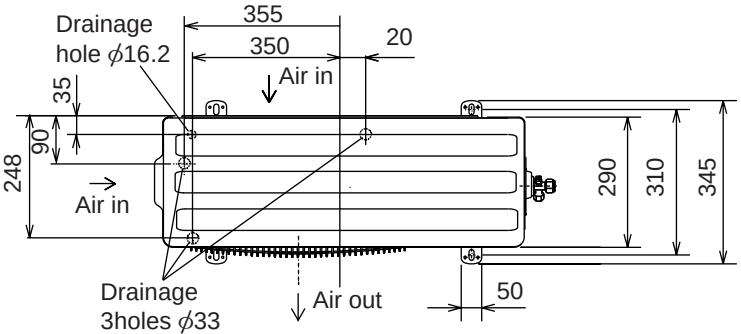


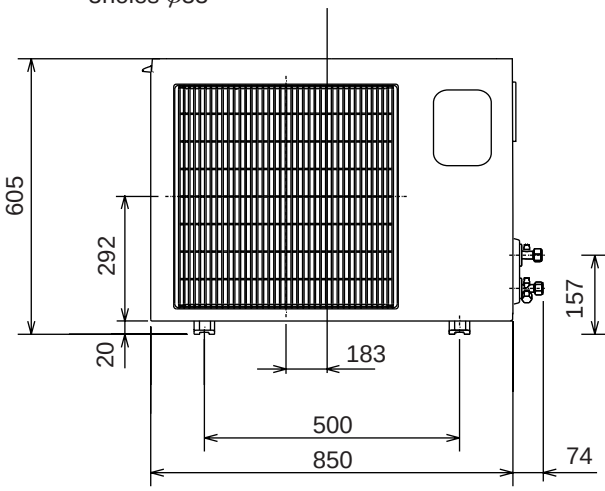


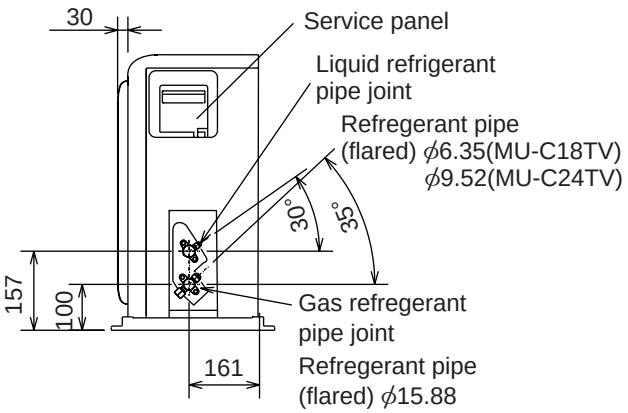


MU-C18TV -E1
MU-C24TV -E1
OUTDOOR UNIT





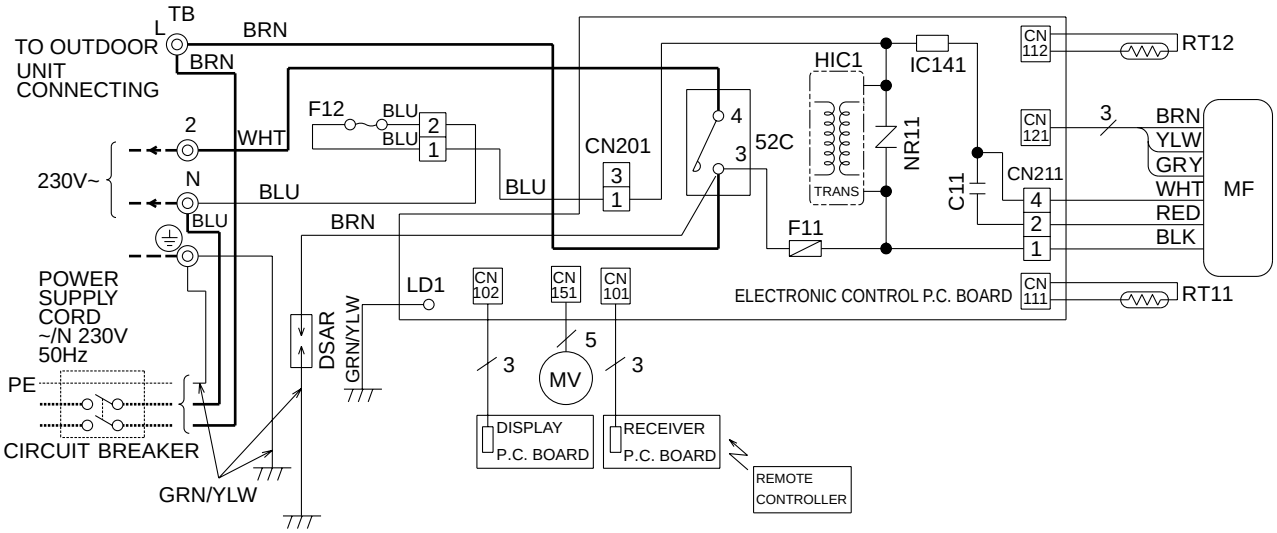




6 WIRING DIAGRAM

MS-C18TV -E1

INDOOR UNIT MODEL WIRING DIAGRAM

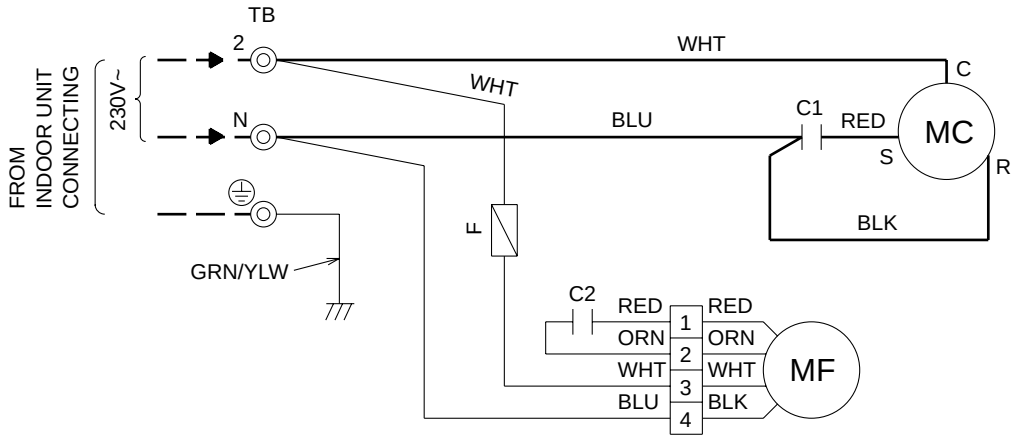


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C11	INDOOR FAN CAPACITOR	IC141	HYBRID IC	RT12	INDOOR COIL THERMISTOR
DSAR	SURGE ABSORBER	MF	INDOOR FAN MOTOR(INNER FUSE)	TB	TERMINAL BLOCK
F11	FUSE(3.15A)	MV	VANE MOTOR	52C	CONTACTOR
F12	THERMAL FUSE(93°C)	NR11	VARISTOR		
HIC1	DC / DC CONVERTER	RT11	ROOM TEMPERATURE THERMISTOR		

NOTE:1. About the outdoor side electric wiring refer to the outdoor unit electric wiring diagram for servicing. VG79B066H01
2. Use copper conductors only. (For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

MU-C18TV -E1

OUTDOOR UNIT MODEL WIRING DIAGRAM

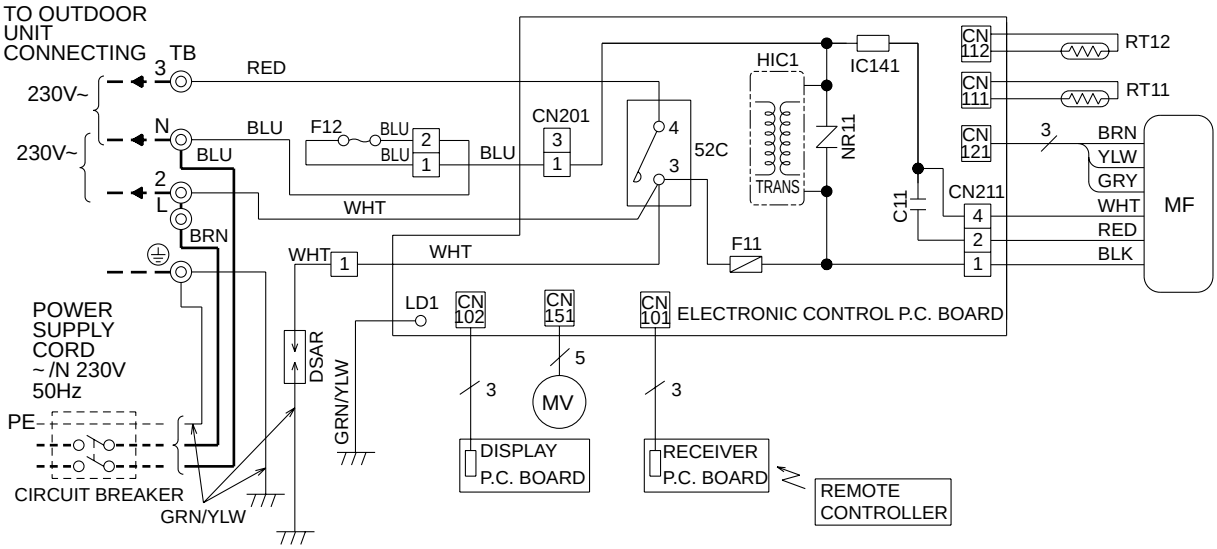


SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
C1	COMPRESSOR CAPACITOR	F	FUSE(2A)	MF	OUTDOOR FAN MOTOR(INNER PROTECTOR)
C2	OUTDOOR FAN CAPACITOR	MC	COMPRESSOR(INNER PROTECTOR)	TB	TERMINAL BLOCK

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing. SG79B965H01
2.Use copper conductors only. (For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

MS-C24TV - E1

INDOOR UNIT MODEL WIRING DIAGRAM



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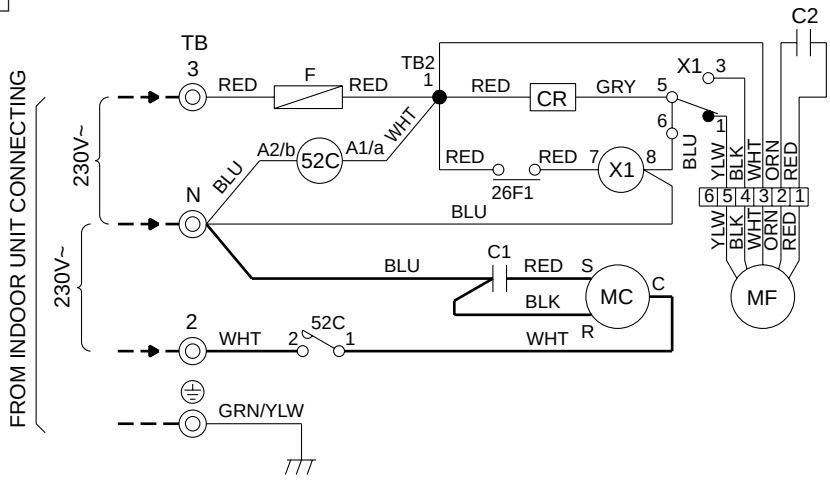
VG79B067H01

MU-C24TV - E1

OUTDOOR UNIT MODEL WIRING DIAGRAM



SYMBOL	NAME	SYMBOL	NAME	SYMBOL	NAME
CR	CR SURGE ABSORBER	MC	COMPRESSOR (INNER PROTECTOR)	X1	FAN MOTOR RELAY
C1	COMPRESSOR CAPACITOR	MF	OUTDOOR FAN MOTOR (INNER PROTECTOR)	26F1	THERMOSTAT (AIR FLOW CONTORL)
C2	OUTDOOR FAN CAPACITOR	TB	TERMINAL BLOCK	52C	COMPRESSOR CONTACTOR
F	FUSE(2A)	TB2	TERMINAL BLOCK		

NOTE:1. About the indoor side electric wiring refer to the indoor unit electric wiring diagram for servicing.
2.Use copper conductors only. (For field wiring)
3. Symbols below indicate.
◎: Terminal block, □□□□: Connector

SG79B964H01

7 REFRIGERANT SYSTEM DIAGRAM

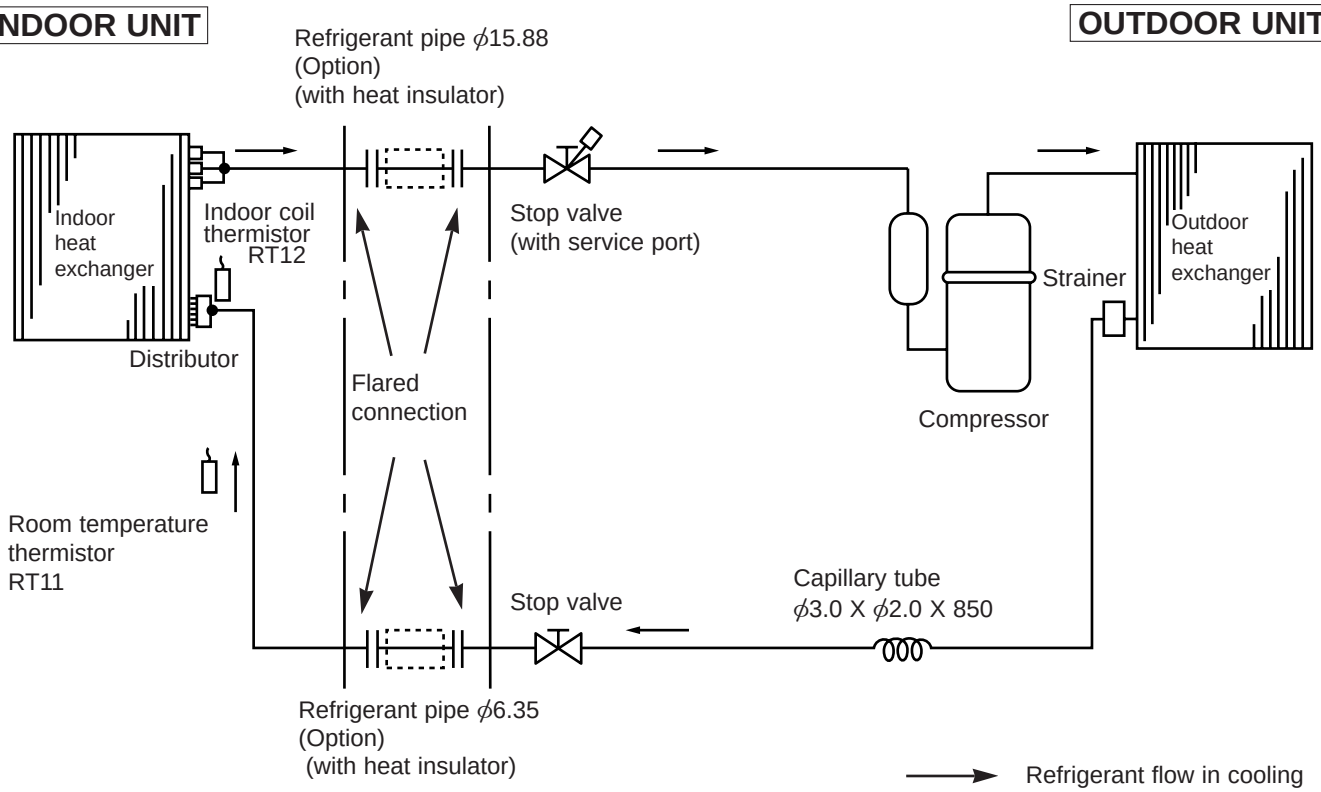
Unit:mm

MS-C18TV -E1

INDOOR UNIT

MU-C18TV -E1

OUTDOOR UNIT



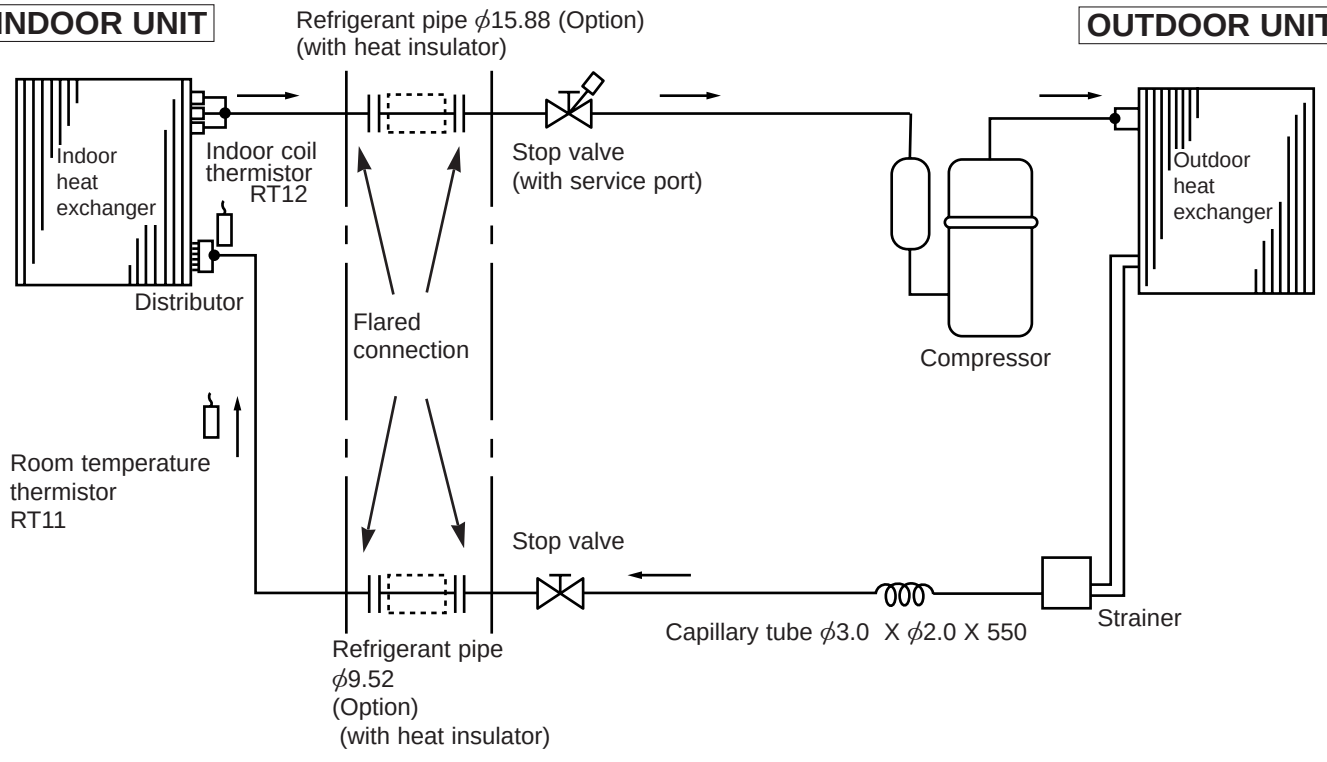
Unit:mm

MS-C24TV -E1

INDOOR UNIT

MU-C24TV -E1

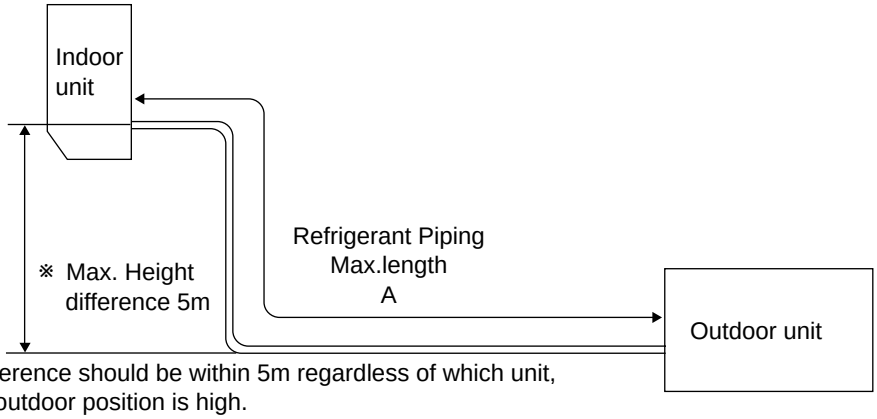
OUTDOOR UNIT



MAX. REFRIGERANT PIPING LENGTH

Model	Refrigerant piping Max. length : m A	Piping size O.D : mm		Length of connecting pipe : m	
		Gas	Liquid	Indoor unit	Outdoor unit
MS-C18TV - E1 **MU-C18TV -** E1	15	15.88	6.35	Gas 0.43 Liquid 0.5	Gas 0 Liquid 0
MS-C24TV - E1 **MU-C24TV -** E1			9.52		

MAX. HEIGHT DIFFERENCE



※ Height difference should be within 5m regardless of which unit, indoor or outdoor position is high.

ADDITIONAL REFRIGERANT CHARGE(R407C : g)

Model	Outdoor unit precharged	Refrigerant piping length (one way)		
		7m	10m	15m
MS-C18TV - E1 **MU-C18TV -** E1	1,100	0	60	160
MS-C24TV - E1 **MU-C24TV -** E1	1,850			

Calculation : Xg=20g/mx(Refrigerant piping length (m)-7)

8 PERFORMANCE CURVES

MS-C18TV -E1 MU-C18TV -E1
MS-C24TV -E1 MU-C24TV -E1

The standard data contained in these specifications apply only to the operation of the air conditioner under normal conditions. Since operating conditions vary according to the areas where these units are installed. The following information has been provided to clarify the operating characteristics of the air conditioner under the conditions indicated by the performance curve.

(1) GUARANTEED VOLTAGE
Rated voltage : 207 ~ 253V,50Hz

(2) AIR FLOW
Air flow should be set at MAX.

(3) MAIN READINGS

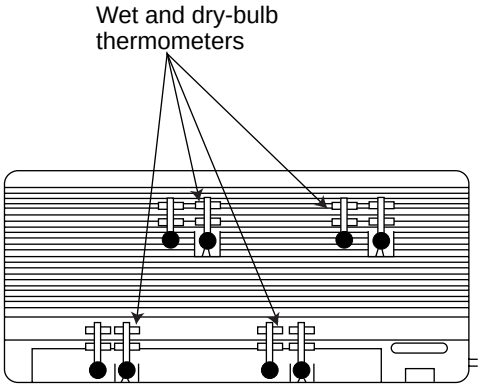
(1) Indoor intake air wet-bulb temperature	:°CWB	Cooling
(2) Indoor outlet air wet-bulb temperature	:°CWB	
(3) Outdoor intake air dry-bulb temperature	:°CDB	
(4) Total input	:W	

Indoor air wet/dry-bulb temperature difference on the left side of the chart on next page shows the difference between the indoor intake air wet/dry-bulb temperature and the indoor outlet air wet/dry -bulb temperature for your reference at service.

How to measure the indoor air wet-bulb/dry-bulb temperature difference

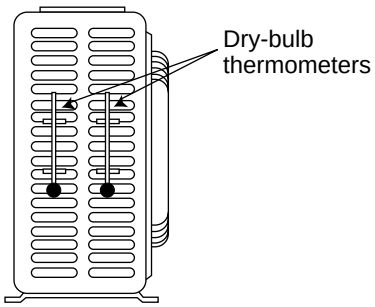
1. Attach at least 2 sets of wet-and dry-bulb thermometers to the indoor air intake as shown in the figure, and at least 2 sets of wet-and dry-bulb thermometers to the indoor air outlet. The thermometers must be attached to the position where air speed is high.
2. Attach at least 2 sets of dry-bulb thermometers to the outdoor air intake. Cover the thermometers to prevent direct rays of the sun.
3. Check that the air filter is cleaned.
4. Open windows and doors of room.
5. Press the EMERGENCY OPERATION switch once to start the EMERGENCY COOL MODE.
6. When system stabilizes after more than 15 minutes, measure temperature and take an average temperature.
7. 10 minutes later, measure temperature again and check that the temperature does not change.

INDOOR UNIT

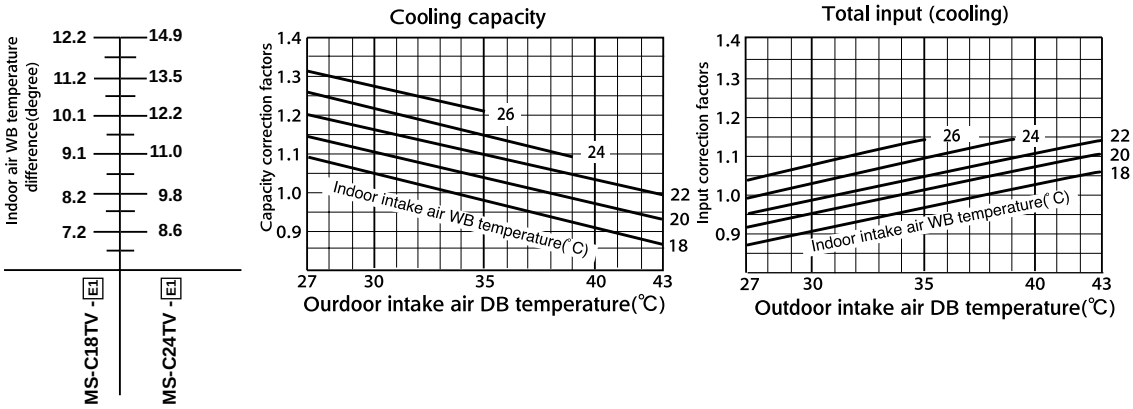


FRONT VIEW

OUTDOOR UNIT



SIDE VIEW



OUTDOOR LOW PRESSURE AND OUTDOOR UNIT CURRENT
COOL operation

① Both indoor and outdoor unit are under the same temperature/humidity condition.

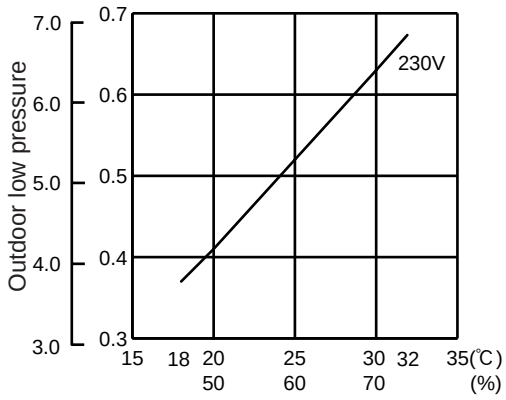
Dry-bulb temperature	Relative humidity(%)
20	50
25	60
30	70

② Air flow should be set at MAX.

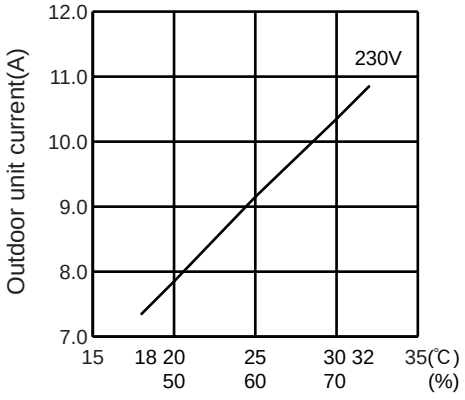
③ The unit of pressure has been changed to MPa on the international system of units(SI unit system).
The conversion factor is : **1(MPa[Gauge]) =10.2(kgf/㎠[Gauge])**

(kgf/㎠[Gauge])(MPa[Gauge])

MU-C18TV -E1

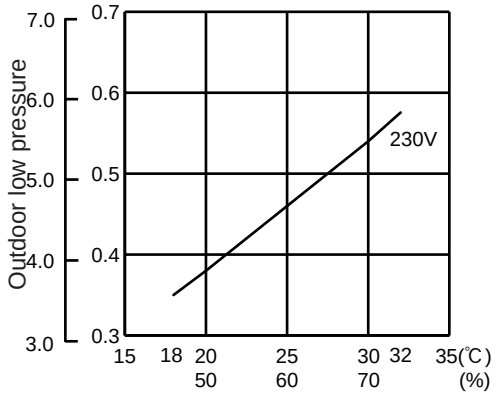


MU-C18TV -E1

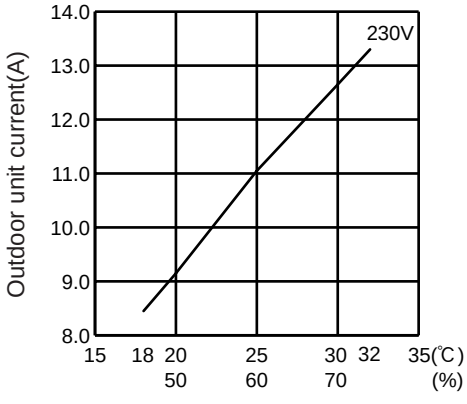


(kgf/㎠[Gauge])(MPa[Gauge])

MU-C24TV -E1



MU-C24TV -E1



PERFORMANCE DATA COOL operation

MS-C18TV -E1 : MU-C18TV -E1

CAPACITY : 5.1(KW) SHF : 0.71 INPUT : 2100(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.99	3.18	0.53	1680	5.74	3.04	0.53	1764	5.51	2.92	0.53	1848	5.30	2.81	0.53	1932
21	20	6.25	2.56	0.41	1764	5.99	2.46	0.41	1869	5.81	2.38	0.41	1911	5.61	2.30	0.41	1995
22	18	5.99	3.42	0.57	1680	5.74	3.27	0.57	1764	5.51	3.14	0.57	1848	5.30	3.02	0.57	1932
22	20	6.25	2.81	0.45	1764	5.99	2.70	0.45	1869	5.81	2.62	0.45	1911	5.61	2.52	0.45	1995
22	22	6.50	2.15	0.33	1827	6.27	2.07	0.33	1943	6.12	2.02	0.33	1995	5.87	1.94	0.33	2079
23	18	5.99	3.66	0.61	1680	5.74	3.50	0.61	1764	5.51	3.36	0.61	1848	5.30	3.24	0.61	1932
23	20	6.25	3.06	0.49	1764	5.99	2.94	0.49	1869	5.81	2.85	0.49	1911	5.61	2.75	0.49	1995
23	22	6.50	2.41	0.37	1827	6.27	2.32	0.37	1943	6.12	2.26	0.37	1995	5.87	2.17	0.37	2079
24	18	5.99	3.90	0.65	1680	5.74	3.73	0.65	1764	5.51	3.58	0.65	1848	5.30	3.45	0.65	1932
24	20	6.25	3.31	0.53	1764	5.99	3.18	0.53	1869	5.81	3.08	0.53	1911	5.61	2.97	0.53	1995
24	22	6.50	2.67	0.41	1827	6.27	2.57	0.41	1943	6.12	2.51	0.41	1995	5.87	2.40	0.41	2079
24	24	6.83	1.98	0.29	1911	6.58	1.91	0.29	2016	6.43	1.86	0.29	2079	6.22	1.80	0.29	2184
25	18	5.99	4.13	0.69	1680	5.74	3.96	0.69	1764	5.51	3.80	0.69	1848	5.30	3.66	0.69	1932
25	20	6.25	3.56	0.57	1764	5.99	3.42	0.57	1869	5.81	3.31	0.57	1911	5.61	3.20	0.57	1995
25	22	6.50	2.93	0.45	1827	6.27	2.82	0.45	1943	6.12	2.75	0.45	1995	5.87	2.64	0.45	2079
25	24	6.83	2.26	0.33	1911	6.58	2.17	0.33	2016	6.43	2.12	0.33	2079	6.22	2.05	0.33	2184
26	18	5.99	4.37	0.73	1680	5.74	4.19	0.73	1764	5.51	4.02	0.73	1848	5.30	3.87	0.73	1932
26	20	6.25	3.81	0.61	1764	5.99	3.66	0.61	1869	5.81	3.55	0.61	1911	5.61	3.42	0.61	1995
26	22	6.50	3.19	0.49	1827	6.27	3.07	0.49	1943	6.12	3.00	0.49	1995	5.87	2.87	0.49	2079
26	24	6.83	2.53	0.37	1911	6.58	2.43	0.37	2016	6.43	2.38	0.37	2079	6.22	2.30	0.37	2184
26	26	7.04	1.76	0.25	2016	6.83	1.71	0.25	2121	6.73	1.68	0.25	2184	6.53	1.63	0.25	2247
27	18	5.99	4.61	0.77	1680	5.74	4.42	0.77	1764	5.51	4.24	0.77	1848	5.30	4.08	0.77	1932
27	20	6.25	4.06	0.65	1764	5.99	3.90	0.65	1869	5.81	3.78	0.65	1911	5.61	3.65	0.65	1995
27	22	6.50	3.45	0.53	1827	6.27	3.32	0.53	1943	6.12	3.24	0.53	1995	5.87	3.11	0.53	2079
27	24	6.83	2.80	0.41	1911	6.58	2.70	0.41	2016	6.43	2.63	0.41	2079	6.22	2.55	0.41	2184
27	26	7.04	2.04	0.29	2016	6.83	1.98	0.29	2121	6.73	1.95	0.29	2184	6.53	1.89	0.29	2247
28	18	5.99	4.85	0.81	1680	5.74	4.65	0.81	1764	5.51	4.46	0.81	1848	5.30	4.30	0.81	1932
28	20	6.25	4.31	0.69	1764	5.99	4.13	0.69	1869	5.81	4.01	0.69	1911	5.61	3.87	0.69	1995
28	22	6.50	3.71	0.57	1827	6.27	3.58	0.57	1943	6.12	3.49	0.57	1995	5.87	3.34	0.57	2079
28	24	6.83	3.08	0.45	1911	6.58	2.96	0.45	2016	6.43	2.89	0.45	2079	6.22	2.80	0.45	2184
28	26	7.04	2.32	0.33	2016	6.83	2.26	0.33	2121	6.73	2.22	0.33	2184	6.53	2.15	0.33	2247
29	18	5.99	5.09	0.85	1680	5.74	4.88	0.85	1764	5.51	4.68	0.85	1848	5.30	4.51	0.85	1932
29	20	6.25	4.56	0.73	1764	5.99	4.37	0.73	1869	5.81	4.24	0.73	1911	5.61	4.10	0.73	1995
29	22	6.50	3.97	0.61	1827	6.27	3.83	0.61	1943	6.12	3.73	0.61	1995	5.87	3.58	0.61	2079
29	24	6.83	3.35	0.49	1911	6.58	3.22	0.49	2016	6.43	3.15	0.49	2079	6.22	3.05	0.49	2184
29	26	7.04	2.60	0.37	2016	6.83	2.53	0.37	2121	6.73	2.49	0.37	2184	6.53	2.42	0.37	2247
30	18	5.99	5.33	0.89	1680	5.74	5.11	0.89	1764	5.51	4.90	0.89	1848	5.30	4.72	0.89	1932
30	20	6.25	4.81	0.77	1764	5.99	4.61	0.77	1869	5.81	4.48	0.77	1911	5.61	4.32	0.77	1995
30	22	6.50	4.23	0.65	1827	6.27	4.08	0.65	1943	6.12	3.98	0.65	1995	5.87	3.81	0.65	2079
30	24	6.83	3.62	0.53	1911	6.58	3.49	0.53	2016	6.43	3.41	0.53	2079	6.22	3.30	0.53	2184
30	26	7.04	2.89	0.41	2016	6.83	2.80	0.41	2121	6.73	2.76	0.41	2184	6.53	2.68	0.41	2247
31	18	5.99	5.57	0.93	1680	5.74	5.34	0.93	1764	5.51	5.12	0.93	1848	5.30	4.93	0.93	1932
31	20	6.25	5.06	0.81	1764	5.99	4.85	0.81	1869	5.81	4.71	0.81	1911	5.61	4.54	0.81	1995
31	22	6.50	4.49	0.69	1827	6.27	4.33	0.69	1943	6.12	4.22	0.69	1995	5.87	4.05	0.69	2079
31	24	6.83	3.90	0.57	1911	6.58	3.75	0.57	2016	6.43	3.66	0.57	2079	6.22	3.55	0.57	2184
31	26	7.04	3.17	0.45	2016	6.83	3.08	0.45	2121	6.73	3.03	0.45	2184	6.53	2.94	0.45	2247
32	18	5.99	5.81	0.97	1680	5.74	5.57	0.97	1764	5.51	5.34	0.97	1848	5.30	5.14	0.97	1932
32	20	6.25	5.31	0.85	1764	5.99	5.09	0.85	1869	5.81	4.94	0.85	1911	5.61	4.77	0.85	1995
32	22	6.50	4.75	0.73	1827	6.27	4.58	0.73	1943	6.12	4.47	0.73	1995	5.87	4.28	0.73	2079
32	24	6.83	4.17	0.61	1911	6.58	4.01	0.61	2016	6.43	3.92	0.61	2079	6.22	3.80	0.61	2184
32	26	7.04	3.45	0.49	2016	6.83	3.35	0.49	2121	6.73	3.30	0.49	2184	6.53	3.20	0.49	2247

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB: Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB: Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-C18TV -E1 : MU-C18TV -E1

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	35				40				43				46			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	5.00	2.65	0.53	2058	4.59	2.43	0.53	2184	4.41	2.34	0.53	2226	4.23	2.24	0.53	2268
21	20	5.25	2.15	0.41	2142	4.90	2.01	0.41	2247	4.72	1.93	0.41	2310	4.54	1.86	0.41	2373
22	18	5.00	2.85	0.57	2058	4.59	2.62	0.57	2184	4.41	2.51	0.57	2226	4.23	2.41	0.57	2268
22	20	5.25	2.36	0.45	2142	4.90	2.20	0.45	2247	4.72	2.12	0.45	2310	4.54	2.04	0.45	2373
22	22	5.56	1.83	0.33	2226	5.20	1.72	0.33	2352	5.02	1.66	0.33	2394	4.85	1.60	0.33	2436
23	18	5.00	3.05	0.61	2058	4.59	2.80	0.61	2184	4.41	2.69	0.61	2226	4.23	2.58	0.61	2268
23	20	5.25	2.57	0.49	2142	4.90	2.40	0.49	2247	4.72	2.31	0.49	2310	4.54	2.22	0.49	2373
23	22	5.56	2.06	0.37	2226	5.20	1.92	0.37	2352	5.02	1.86	0.37	2394	4.85	1.79	0.37	2436
24	18	5.00	3.25	0.65	2058	4.59	2.98	0.65	2184	4.41	2.87	0.65	2226	4.23	2.75	0.65	2268
24	20	5.25	2.78	0.53	2142	4.90	2.59	0.53	2247	4.72	2.50	0.53	2310	4.54	2.41	0.53	2373
24	22	5.56	2.28	0.41	2226	5.20	2.13	0.41	2352	5.02	2.06	0.41	2394	4.85	1.99	0.41	2436
24	24	5.87	1.70	0.29	2310	5.51	1.60	0.29	2415	5.36	1.55	0.29	2468	5.20	1.51	0.29	2520
25	18	5.00	3.45	0.69	2058	4.59	3.17	0.69	2184	4.41	3.04	0.69	2226	4.23	2.92	0.69	2268
25	20	5.25	2.99	0.57	2142	4.90	2.79	0.57	2247	4.72	2.69	0.57	2310	4.54	2.59	0.57	2373
25	22	5.56	2.50	0.45	2226	5.20	2.34	0.45	2352	5.02	2.26	0.45	2394	4.85	2.18	0.45	2436
25	24	5.87	1.94	0.33	2310	5.51	1.82	0.33	2415	5.36	1.77	0.33	2468	5.20	1.72	0.33	2520
26	18	5.00	3.65	0.73	2058	4.59	3.35	0.73	2184	4.41	3.22	0.73	2226	4.23	3.09	0.73	2268
26	20	5.25	3.20	0.61	2142	4.90	2.99	0.61	2247	4.72	2.88	0.61	2310	4.54	2.77	0.61	2373
26	22	5.56	2.72	0.49	2226	5.20	2.55	0.49	2352	5.02	2.46	0.49	2394	4.85	2.37	0.49	2436
26	24	5.87	2.17	0.37	2310	5.51	2.04	0.37	2415	5.36	1.98	0.37	2468	5.20	1.92	0.37	2520
26	26	6.17	1.54	0.25	2394	5.81	1.45	0.25	2499	5.64	1.41	0.25	2552	5.46	1.36	0.25	2604
27	18	5.00	3.85	0.77	2058	4.59	3.53	0.77	2184	4.41	3.40	0.77	2226	4.23	3.26	0.77	2268
27	20	5.25	3.41	0.65	2142	4.90	3.18	0.65	2247	4.72	3.07	0.65	2310	4.54	2.95	0.65	2373
27	22	5.56	2.95	0.53	2226	5.20	2.76	0.53	2352	5.02	2.66	0.53	2394	4.85	2.57	0.53	2436
27	24	5.87	2.40	0.41	2310	5.51	2.26	0.41	2415	5.36	2.20	0.41	2468	5.20	2.13	0.41	2520
27	26	6.17	1.79	0.29	2394	5.81	1.69	0.29	2499	5.64	1.63	0.29	2552	5.46	1.58	0.29	2604
28	18	5.00	4.05	0.81	2058	4.59	3.72	0.81	2184	4.41	3.57	0.81	2226	4.23	3.43	0.81	2268
28	20	5.25	3.62	0.69	2142	4.90	3.38	0.69	2247	4.72	3.26	0.69	2310	4.54	3.13	0.69	2373
28	22	5.56	3.17	0.57	2226	5.20	2.97	0.57	2352	5.02	2.86	0.57	2394	4.85	2.76	0.57	2436
28	24	5.87	2.64	0.45	2310	5.51	2.48	0.45	2415	5.36	2.41	0.45	2468	5.20	2.34	0.45	2520
28	26	6.17	2.04	0.33	2394	5.81	1.92	0.33	2499	5.64	1.86	0.33	2552	5.46	1.80	0.33	2604
29	18	5.00	4.25	0.85	2058	4.59	3.90	0.85	2184	4.41	3.75	0.85	2226	4.23	3.60	0.85	2268
29	20	5.25	3.83	0.73	2142	4.90	3.57	0.73	2247	4.72	3.44	0.73	2310	4.54	3.31	0.73	2373
29	22	5.56	3.39	0.61	2226	5.20	3.17	0.61	2352	5.02	3.06	0.61	2394	4.85	2.96	0.61	2436
29	24	5.87	2.87	0.49	2310	5.51	2.70	0.49	2415	5.36	2.62	0.49	2468	5.20	2.55	0.49	2520
29	26	6.17	2.28	0.37	2394	5.81	2.15	0.37	2499	5.64	2.09	0.37	2552	5.46	2.02	0.37	2604
30	18	5.00	4.45	0.89	2058	4.59	4.09	0.89	2184	4.41	3.93	0.89	2226	4.23	3.77	0.89	2268
30	20	5.25	4.04	0.77	2142	4.90	3.77	0.77	2247	4.72	3.63	0.77	2310	4.54	3.50	0.77	2373
30	22	5.56	3.61	0.65	2226	5.20	3.38	0.65	2352	5.02	3.27	0.65	2394	4.85	3.15	0.65	2436
30	24	5.87	3.11	0.53	2310	5.51	2.92	0.53	2415	5.36	2.84	0.53	2468	5.20	2.76	0.53	2520
30	26	6.17	2.53	0.41	2394	5.81	2.38	0.41	2499	5.64	2.31	0.41	2552	5.46	2.24	0.41	2604
31	18	5.00	4.65	0.93	2058	4.59	4.27	0.93	2184	4.41	4.10	0.93	2226	4.23	3.94	0.93	2268
31	20	5.25	4.25	0.81	2142	4.90	3.97	0.81	2247	4.72	3.82	0.81	2310	4.54	3.68	0.81	2373
31	22	5.56	3.84	0.69	2226	5.20	3.59	0.69	2352	5.02	3.47	0.69	2394	4.85	3.34	0.69	2436
31	24	5.87	3.34	0.57	2310	5.51	3.14	0.57	2415	5.36	3.05	0.57	2468	5.20	2.97	0.57	2520
31	26	6.17	2.78	0.45	2394	5.81	2.62	0.45	2499	5.64	2.54	0.45	2552	5.46	2.46	0.45	2604
32	18	5.00	4.85	0.97	2058	4.59	4.45	0.97	2184	4.41	4.28	0.97	2226	4.23	4.11	0.97	2268
32	20	5.25	4.47	0.85	2142	4.90	4.16	0.85	2247	4.72	4.01	0.85	2310	4.54	3.86	0.85	2373
32	22	5.56	4.06	0.73	2226	5.20	3.80	0.73	2352	5.02	3.67	0.73	2394	4.85	3.54	0.73	2436
32	24	5.87	3.58	0.61	2310	5.51	3.36	0.61	2415	5.36	3.27	0.61	2468	5.20	3.17	0.61	2520
32	26	6.17	3.02	0.49	2394	5.81	2.85	0.49	2499	5.64	2.76	0.49	2552	5.46	2.67	0.49	2604

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB: Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB: Wet-bulb temperature

PERFORMANCE DATA COOL operation

MS-C24TV -E1 : MU-C24TV -E1

CAPACITY : 6.4(KW) SHF : 0.66 INPUT : 2840(W)

		OUTDOOR DB(℃)															
INDOOR DB(℃)	INDOOR WB(℃)	21				25				27				30			
		Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	7.52	3.61	0.48	2272	7.20	3.46	0.48	2386	6.91	3.32	0.48	2499	6.66	3.19	0.48	2613
21	20	7.84	2.82	0.36	2386	7.52	2.71	0.36	2528	7.30	2.63	0.36	2584	7.04	2.53	0.36	2698
22	18	7.52	3.91	0.52	2272	7.20	3.74	0.52	2386	6.91	3.59	0.52	2499	6.66	3.46	0.52	2613
22	20	7.84	3.14	0.40	2386	7.52	3.01	0.40	2528	7.30	2.92	0.40	2584	7.04	2.82	0.40	2698
22	22	8.16	2.28	0.28	2471	7.87	2.20	0.28	2627	7.68	2.15	0.28	2698	7.36	2.06	0.28	2812
23	18	7.52	4.21	0.56	2272	7.20	4.03	0.56	2386	6.91	3.87	0.56	2499	6.66	3.73	0.56	2613
23	20	7.84	3.45	0.44	2386	7.52	3.31	0.44	2528	7.30	3.21	0.44	2584	7.04	3.10	0.44	2698
23	22	8.16	2.61	0.32	2471	7.87	2.52	0.32	2627	7.68	2.46	0.32	2698	7.36	2.36	0.32	2812
24	18	7.52	4.51	0.60	2272	7.20	4.32	0.60	2386	6.91	4.15	0.60	2499	6.66	3.99	0.60	2613
24	20	7.84	3.76	0.48	2386	7.52	3.61	0.48	2528	7.30	3.50	0.48	2584	7.04	3.38	0.48	2698
24	22	8.16	2.94	0.36	2471	7.87	2.83	0.36	2627	7.68	2.76	0.36	2698	7.36	2.65	0.36	2812
24	24	8.58	2.06	0.24	2584	8.26	1.98	0.24	2726	8.06	1.94	0.24	2812	7.81	1.87	0.24	2954
25	18	7.52	4.81	0.64	2272	7.20	4.61	0.64	2386	6.91	4.42	0.64	2499	6.66	4.26	0.64	2613
25	20	7.84	4.08	0.52	2386	7.52	3.91	0.52	2528	7.30	3.79	0.52	2584	7.04	3.66	0.52	2698
25	22	8.16	3.26	0.40	2471	7.87	3.15	0.40	2627	7.68	3.07	0.40	2698	7.36	2.94	0.40	2812
25	24	8.58	2.40	0.28	2584	8.26	2.31	0.28	2726	8.06	2.26	0.28	2812	7.81	2.19	0.28	2954
26	18	7.52	5.11	0.68	2272	7.20	4.90	0.68	2386	6.91	4.70	0.68	2499	6.66	4.53	0.68	2613
26	20	7.84	4.39	0.56	2386	7.52	4.21	0.56	2528	7.30	4.09	0.56	2584	7.04	3.94	0.56	2698
26	22	8.16	3.59	0.44	2471	7.87	3.46	0.44	2627	7.68	3.38	0.44	2698	7.36	3.24	0.44	2812
26	24	8.58	2.74	0.32	2584	8.26	2.64	0.32	2726	8.06	2.58	0.32	2812	7.81	2.50	0.32	2954
26	26	8.83	1.77	0.20	2726	8.58	1.72	0.20	2868	8.45	1.69	0.20	2954	8.19	1.64	0.20	3039
27	18	7.52	5.41	0.72	2272	7.20	5.18	0.72	2386	6.91	4.98	0.72	2499	6.66	4.79	0.72	2613
27	20	7.84	4.70	0.60	2386	7.52	4.51	0.60	2528	7.30	4.38	0.60	2584	7.04	4.22	0.60	2698
27	22	8.16	3.92	0.48	2471	7.87	3.78	0.48	2627	7.68	3.69	0.48	2698	7.36	3.53	0.48	2812
27	24	8.58	3.09	0.36	2584	8.26	2.97	0.36	2726	8.06	2.90	0.36	2812	7.81	2.81	0.36	2954
27	26	8.83	2.12	0.24	2726	8.58	2.06	0.24	2868	8.45	2.03	0.24	2954	8.19	1.97	0.24	3039
28	18	7.52	5.72	0.76	2272	7.20	5.47	0.76	2386	6.91	5.25	0.76	2499	6.66	5.06	0.76	2613
28	20	7.84	5.02	0.64	2386	7.52	4.81	0.64	2528	7.30	4.67	0.64	2584	7.04	4.51	0.64	2698
28	22	8.16	4.24	0.52	2471	7.87	4.09	0.52	2627	7.68	3.99	0.52	2698	7.36	3.83	0.52	2812
28	24	8.58	3.43	0.40	2584	8.26	3.30	0.40	2726	8.06	3.23	0.40	2812	7.81	3.12	0.40	2954
28	26	8.83	2.47	0.28	2726	8.58	2.40	0.28	2868	8.45	2.37	0.28	2954	8.19	2.29	0.28	3039
29	18	7.52	6.02	0.80	2272	7.20	5.76	0.80	2386	6.91	5.53	0.80	2499	6.66	5.32	0.80	2613
29	20	7.84	5.33	0.68	2386	7.52	5.11	0.68	2528	7.30	4.96	0.68	2584	7.04	4.79	0.68	2698
29	22	8.16	4.57	0.56	2471	7.87	4.41	0.56	2627	7.68	4.30	0.56	2698	7.36	4.12	0.56	2812
29	24	8.58	3.77	0.44	2584	8.26	3.63	0.44	2726	8.06	3.55	0.44	2812	7.81	3.44	0.44	2954
29	26	8.83	2.83	0.32	2726	8.58	2.74	0.32	2868	8.45	2.70	0.32	2954	8.19	2.62	0.32	3039
30	18	7.52	6.32	0.84	2272	7.20	6.05	0.84	2386	6.91	5.81	0.84	2499	6.66	5.59	0.84	2613
30	20	7.84	5.64	0.72	2386	7.52	5.41	0.72	2528	7.30	5.25	0.72	2584	7.04	5.07	0.72	2698
30	22	8.16	4.90	0.60	2471	7.87	4.72	0.60	2627	7.68	4.61	0.60	2698	7.36	4.42	0.60	2812
30	24	8.58	4.12	0.48	2584	8.26	3.96	0.48	2726	8.06	3.87	0.48	2812	7.81	3.75	0.48	2954
30	26	8.83	3.18	0.36	2726	8.58	3.09	0.36	2868	8.45	3.04	0.36	2954	8.19	2.95	0.36	3039
31	18	7.52	6.62	0.88	2272	7.20	6.34	0.88	2386	6.91	6.08	0.88	2499	6.66	5.86	0.88	2613
31	20	7.84	5.96	0.76	2386	7.52	5.72	0.76	2528	7.30	5.54	0.76	2584	7.04	5.35	0.76	2698
31	22	8.16	5.22	0.64	2471	7.87	5.04	0.64	2627	7.68	4.92	0.64	2698	7.36	4.71	0.64	2812
31	24	8.58	4.46	0.52	2584	8.26	4.29	0.52	2726	8.06	4.19	0.52	2812	7.81	4.06	0.52	2954
31	26	8.83	3.53	0.40	2726	8.58	3.43	0.40	2868	8.45	3.38	0.40	2954	8.19	3.28	0.40	3039
32	18	7.52	6.92	0.92	2272	7.20	6.62	0.92	2386	6.91	6.36	0.92	2499	6.66	6.12	0.92	2613
32	20	7.84	6.27	0.80	2386	7.52	6.02	0.80	2528	7.30	5.84	0.80	2584	7.04	5.63	0.80	2698
32	22	8.16	5.55	0.68	2471	7.87	5.35	0.68	2627	7.68	5.22	0.68	2698	7.36	5.00	0.68	2812
32	24	8.58	4.80	0.56	2584	8.26	4.62	0.56	2726	8.06	4.52	0.56	2812	7.81	4.37	0.56	2954
32	26	8.83	3.89	0.44	2726	8.58	3.77	0.44	2868	8.45	3.72	0.44	2954	8.19	3.60	0.44	3039

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB: Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB: Wet-bulb temperature

PERFORMANCE DATA COOL operation

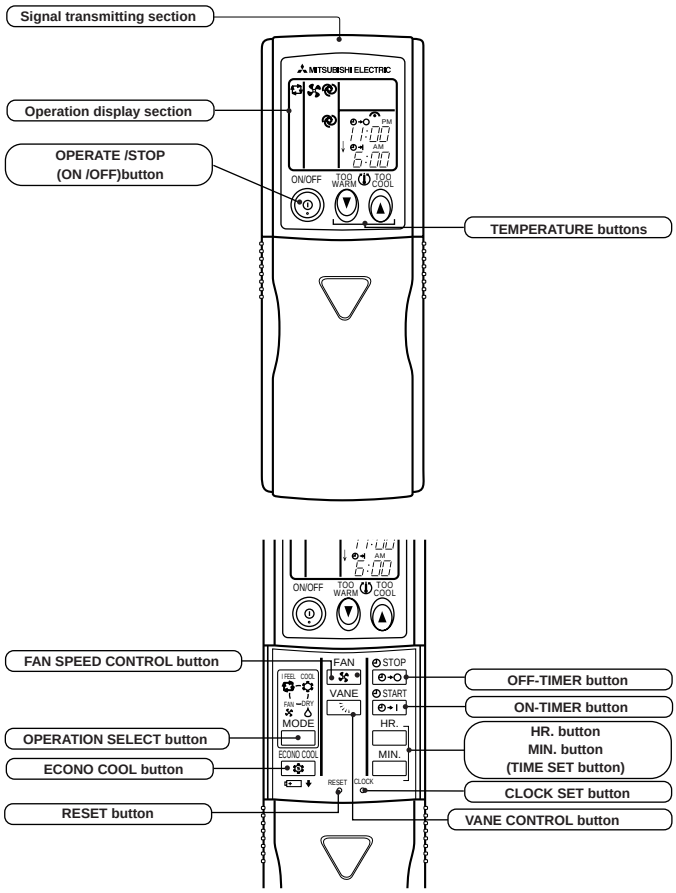
MS-C24TV -E1 : MU-C24TV -E1

		OUTDOOR DB(℃)															
INDOOR	INDOOR	35				40				43				46			
DB(℃)	WB(℃)	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT	Q	SHC	SHF	INPUT
21	18	6.27	3.01	0.48	2783	5.76	2.76	0.48	2954	5.54	2.66	0.48	3010	5.31	2.55	0.48	3067
21	20	6.59	2.37	0.36	2897	6.14	2.21	0.36	3039	5.92	2.13	0.36	3124	5.70	2.05	0.36	3209
22	18	6.27	3.26	0.52	2783	5.76	3.00	0.52	2954	5.54	2.88	0.52	3010	5.31	2.76	0.52	3067
22	20	6.59	2.64	0.40	2897	6.14	2.46	0.40	3039	5.92	2.37	0.40	3124	5.70	2.28	0.40	3209
22	22	6.98	1.95	0.28	3010	6.53	1.83	0.28	3181	6.30	1.77	0.28	3238	6.08	1.70	0.28	3294
23	18	6.27	3.51	0.56	2783	5.76	3.23	0.56	2954	5.54	3.10	0.56	3010	5.31	2.97	0.56	3067
23	20	6.59	2.90	0.44	2897	6.14	2.70	0.44	3039	5.92	2.60	0.44	3124	5.70	2.51	0.44	3209
23	22	6.98	2.23	0.32	3010	6.53	2.09	0.32	3181	6.30	2.02	0.32	3238	6.08	1.95	0.32	3294
24	18	6.27	3.76	0.60	2783	5.76	3.46	0.60	2954	5.54	3.32	0.60	3010	5.31	3.19	0.60	3067
24	20	6.59	3.16	0.48	2897	6.14	2.95	0.48	3039	5.92	2.84	0.48	3124	5.70	2.73	0.48	3209
24	22	6.98	2.51	0.36	3010	6.53	2.35	0.36	3181	6.30	2.27	0.36	3238	6.08	2.19	0.36	3294
24	24	7.36	1.77	0.24	3124	6.91	1.66	0.24	3266	6.72	1.61	0.24	3337	6.53	1.57	0.24	3408
25	18	6.27	4.01	0.64	2783	5.76	3.69	0.64	2954	5.54	3.54	0.64	3010	5.31	3.40	0.64	3067
25	20	6.59	3.43	0.52	2897	6.14	3.19	0.52	3039	5.92	3.08	0.52	3124	5.70	2.96	0.52	3209
25	22	6.98	2.79	0.40	3010	6.53	2.61	0.40	3181	6.30	2.52	0.40	3238	6.08	2.43	0.40	3294
25	24	7.36	2.06	0.28	3124	6.91	1.94	0.28	3266	6.72	1.88	0.28	3337	6.53	1.83	0.28	3408
26	18	6.27	4.26	0.68	2783	5.76	3.92	0.68	2954	5.54	3.76	0.68	3010	5.31	3.61	0.68	3067
26	20	6.59	3.69	0.56	2897	6.14	3.44	0.56	3039	5.92	3.32	0.56	3124	5.70	3.19	0.56	3209
26	22	6.98	3.07	0.44	3010	6.53	2.87	0.44	3181	6.30	2.77	0.44	3238	6.08	2.68	0.44	3294
26	24	7.36	2.36	0.32	3124	6.91	2.21	0.32	3266	6.72	2.15	0.32	3337	6.53	2.09	0.32	3408
26	26	7.74	1.55	0.20	3238	7.30	1.46	0.20	3380	7.07	1.41	0.20	3451	6.85	1.37	0.20	3522
27	18	6.27	4.52	0.72	2783	5.76	4.15	0.72	2954	5.54	3.99	0.72	3010	5.31	3.82	0.72	3067
27	20	6.59	3.96	0.60	2897	6.14	3.69	0.60	3039	5.92	3.55	0.60	3124	5.70	3.42	0.60	3209
27	22	6.98	3.35	0.48	3010	6.53	3.13	0.48	3181	6.30	3.03	0.48	3238	6.08	2.92	0.48	3294
27	24	7.36	2.65	0.36	3124	6.91	2.49	0.36	3266	6.72	2.42	0.36	3337	6.53	2.35	0.36	3408
27	26	7.74	1.86	0.24	3238	7.30	1.75	0.24	3380	7.07	1.70	0.24	3451	6.85	1.64	0.24	3522
28	18	6.27	4.77	0.76	2783	5.76	4.38	0.76	2954	5.54	4.21	0.76	3010	5.31	4.04	0.76	3067
28	20	6.59	4.22	0.64	2897	6.14	3.93	0.64	3039	5.92	3.79	0.64	3124	5.70	3.65	0.64	3209
28	22	6.98	3.63	0.52	3010	6.53	3.39	0.52	3181	6.30	3.28	0.52	3238	6.08	3.16	0.52	3294
28	24	7.36	2.94	0.40	3124	6.91	2.76	0.40	3266	6.72	2.69	0.40	3337	6.53	2.61	0.40	3408
28	26	7.74	2.17	0.28	3238	7.30	2.04	0.28	3380	7.07	1.98	0.28	3451	6.85	1.92	0.28	3522
29	18	6.27	5.02	0.80	2783	5.76	4.61	0.80	2954	5.54	4.43	0.80	3010	5.31	4.25	0.80	3067
29	20	6.59	4.48	0.68	2897	6.14	4.18	0.68	3039	5.92	4.03	0.68	3124	5.70	3.87	0.68	3209
29	22	6.98	3.91	0.56	3010	6.53	3.66	0.56	3181	6.30	3.53	0.56	3238	6.08	3.40	0.56	3294
29	24	7.36	3.24	0.44	3124	6.91	3.04	0.44	3266	6.72	2.96	0.44	3337	6.53	2.87	0.44	3408
29	26	7.74	2.48	0.32	3238	7.30	2.33	0.32	3380	7.07	2.26	0.32	3451	6.85	2.19	0.32	3522
30	18	6.27	5.27	0.84	2783	5.76	4.84	0.84	2954	5.54	4.65	0.84	3010	5.31	4.46	0.84	3067
30	20	6.59	4.75	0.72	2897	6.14	4.42	0.72	3039	5.92	4.26	0.72	3124	5.70	4.10	0.72	3209
30	22	6.98	4.19	0.60	3010	6.53	3.92	0.60	3181	6.30	3.78	0.60	3238	6.08	3.65	0.60	3294
30	24	7.36	3.53	0.48	3124	6.91	3.32	0.48	3266	6.72	3.23	0.48	3337	6.53	3.13	0.48	3408
30	26	7.74	2.79	0.36	3238	7.30	2.63	0.36	3380	7.07	2.55	0.36	3451	6.85	2.47	0.36	3522
31	18	6.27	5.52	0.88	2783	5.76	5.07	0.88	2954	5.54	4.87	0.88	3010	5.31	4.67	0.88	3067
31	20	6.59	5.01	0.76	2897	6.14	4.67	0.76	3039	5.92	4.50	0.76	3124	5.70	4.33	0.76	3209
31	22	6.98	4.46	0.64	3010	6.53	4.18	0.64	3181	6.30	4.03	0.64	3238	6.08	3.89	0.64	3294
31	24	7.36	3.83	0.52	3124	6.91	3.59	0.52	3266	6.72	3.49	0.52	3337	6.53	3.39	0.52	3408
31	26	7.74	3.10	0.40	3238	7.30	2.92	0.40	3380	7.07	2.83	0.40	3451	6.85	2.74	0.40	3522
32	18	6.27	5.77	0.92	2783	5.76	5.30	0.92	2954	5.54	5.09	0.92	3010	5.31	4.89	0.92	3067
32	20	6.59	5.27	0.80	2897	6.14	4.92	0.80	3039	5.92	4.74	0.80	3124	5.70	4.56	0.80	3209
32	22	6.98	4.74	0.68	3010	6.53	4.44	0.68	3181	6.30	4.29	0.68	3238	6.08	4.13	0.68	3294
32	24	7.36	4.12	0.56	3124	6.91	3.87	0.56	3266	6.72	3.76	0.56	3337	6.53	3.66	0.56	3408
32	26	7.74	3.41	0.44	3238	7.30	3.21	0.44	3380	7.07	3.11	0.44	3451	6.85	3.01	0.44	3522

NOTE Q : Total capacity (kW) SHF : Sensible heat factor DB: Dry-bulb temperature
SHC : Sensible heat capacity (kW) INPUT : Total power input (W) WB: Wet-bulb temperature

9 MICROPROCESSOR CONTROL

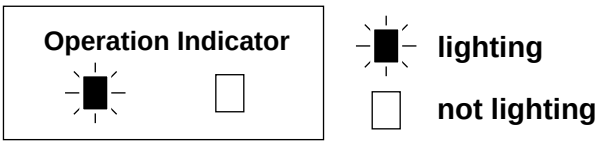
WIRELESS REMOTE CONTROLLER



INDOOR UNIT DISPLAY SECTION

Operation Indicator lamp

The operation indicator at the right side of the indoor unit indicates the operation state.



Indication	Operation state	Difference between set temperature and room temperature
☀ ☀	This shows that the air conditioner is operating to reach the target temperature. Please wait until the target temperature is obtained.	Approx. 2 ℃ or more
☀ □	This shows that the room temperature is approaching the target temperature.	Approx. 2 ℃ or less

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Once the operation mode are set, the same operation mode can be repeated by simply turning the OPERATE/STOP(ON/OFF) button ON.
Indoor unit receives the signal with a beep tone.
When the system turns off, 3-minute time delay will operate to protect system from overload and compressor will not restart for 3 minutes.

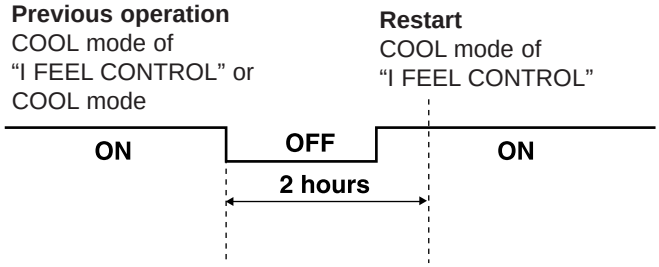
9-1. "I FEEL CONTROL" (▭) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button on the remote controller. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select "I FEEL CONTROL"(▭) mode with the OPERATION SELECT button.
(3) The operation mode is determined by the room temperature at start-up of the operation.

Initial room temperature	mode
25℃ or more	COOL mode of "I FEEL CONTROL"
more than 13℃, less than 25℃	DRY mode of "I FEEL CONTROL"

- Once the mode is fixed, the mode does not change by room temperature afterwards.
- Under the ON-TIMER (◴→|) operation, the mode is determined according to the room temperature at the set time the operation starts.
- When the system is stopped on the remote controller, and restarted within 2 hours in "I FEEL CONTROL" (▭) mode, the system operates in previous mode automatically regardless of the room temperature.

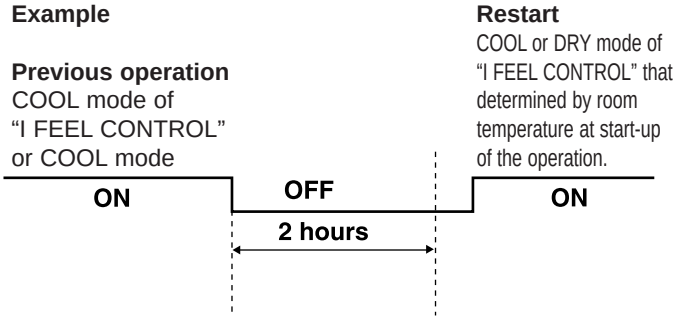
Example



When the system is restarted after 2 hours and more, the operation mode is determined by the room temperature at start-up of the operation.

Operation timer chart

Example



(4) The initial set temperature is decided by the initial room temperature.

Mode	Initial room temperature	Initial set temperature	
COOL mode of "I FEEL CONTROL"	26℃ or more	24℃	※1
	25℃ to 26℃	Initial room temperature minus 2℃	
DRY mode of "I FEEL CONTROL"	more than13℃, less than 25℃	Initial room temperature minus 2℃	

※1 When the system is restarted with the remote controller, the system operates with the previous set temperature regardless of the room temperature at restart.
The set temperature is calculated by the previous set temperature.

(5) TEMPERATURE buttons

In “I FEEL CONTROL” ( ) mode, set temperature is decided by the microprocessor based on the room temperature.
In addition, set temperature can be controlled by TOO WARM or TOO COOL buttons when you feel too cool or too warm.
Each time the TOO WARM or TOO COOL button is pressed the indoor unit receives the signal and emits a beep tone.

● **Fuzzy control**

When the TOO COOL or TOO WARM button is pressed the microprocessor changes the set temperature, considering the room temperature, the frequency of pressing TOO COOL or TOO WARM button and the user’s preference to heat or cool. So this is called “Fuzzy control”, and works only in “I FEEL CONTROL” mode.
In DRY mode of “I FEEL CONTROL”, the set temperature doesn’t change.

TOO COOL ⋯ To raise the set temperature 1~2 degrees(°C)

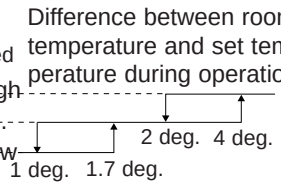
TOO WARM ⋯ To lower the set temperature 1~2 degrees(°C)

— COOL mode of “I FEEL CONTROL” —

1. Indoor fan speed control

Indoor fan operates at the set speed by FAN SPEED CONTROL button.
In AUTO the fan speed is as follows.

Initial temperature difference	Fan speed
Room temperature minus set temperature : 2 degrees or more	High
Room temperature minus set temperature : Between 1 and 2 degrees	Med.
Room temperature minus set temperature : less than 1 degree	Low



2. Coil frost prevention

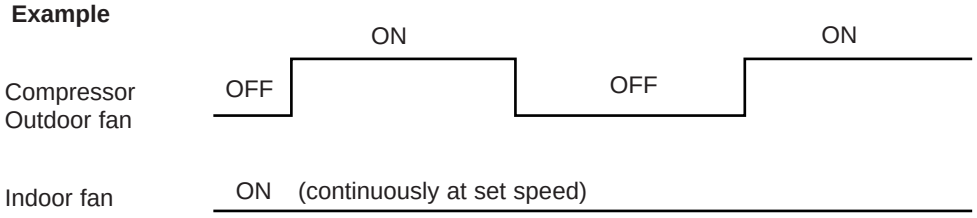
① Temperature control

When the indoor coil thermistor RT12 reads -1°C or below, the coil frost prevention mode starts immediately.
However, the coil frost prevention doesn’t work for 5 minutes since the compressor has started.
The indoor fan operates at the set speed and the compressor stops for 5 minutes.
After that, if RT12still reads below -1°C this mode is prolonged until the RT12 reads over -1°C.

② Time control

When the three conditions as follows have been satisfied for 1 hour and 45 minutes, compressor stops for 3 minutes.
a. Compressor has been continuously operating.
b. Indoor fan speed is Low or Med..
c. Room temperature is below 26°C.
When compressor stops, the accumulated time is cancelled and when compressor restarts, time counting starts from the beginning.
Time counting also stops temporarily when the indoor fan speed becomes High or the room temperature exceeds 26°C. However, when two of the above conditions (b.and c.) are satisfied again.Time accumulation is resumed.

Operation chart
Example



—DRY mode of "I FEEL CONTROL"—

The system for dry operation uses the same refrigerant circuit as the cooling circuit.
The compressor and the indoor fan are controlled by the room temperature.
By such controls, indoor flow amounts will be reduced in order to lower humidity without much room temperature decrease.

1. Indoor fan speed control

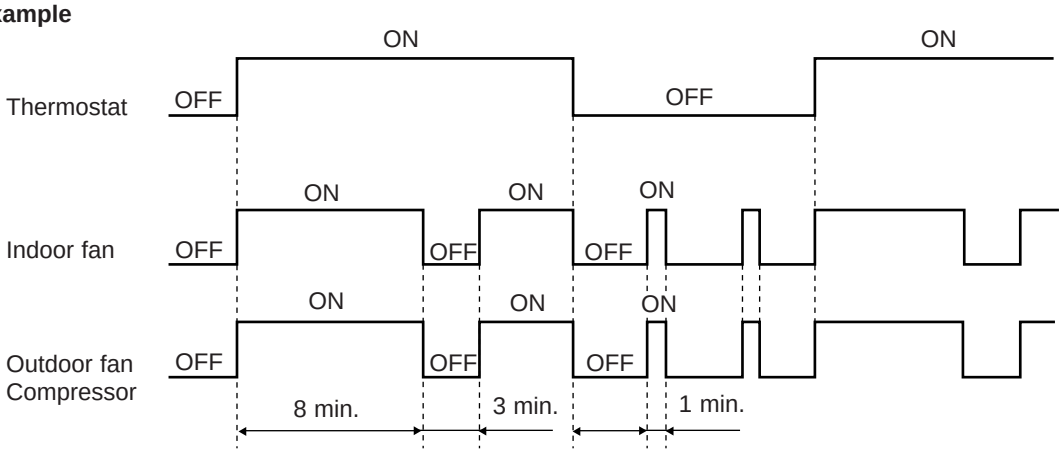
Indoor fan operates at the set speed by FAN SPEED CONTROL button.
However, in AUTO fan operation, fan speed becomes Low.

2. The operation of the compressor and indoor / outdoor fan

Compressor operates by room temperature control and time control.
Set temperature is controlled to fall 2°C from initial room temperature.
Indoor fan and outdoor fan operate in the same cycle as the compressor.

- When the room temperature is 23°C or over:
  When the thermostat is ON, the compressor repeats 8 minutes ON and 3 minutes OFF.
  When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.
- When the room temperature is under 23°C.
  When the thermostat is ON, the compressor repeats 2 minutes ON and 3 minutes OFF.
  When the thermostat is OFF, the compressor repeats 4 minutes OFF and 1 minute ON.

Operation time chart
Example



3. Coil frost prevention

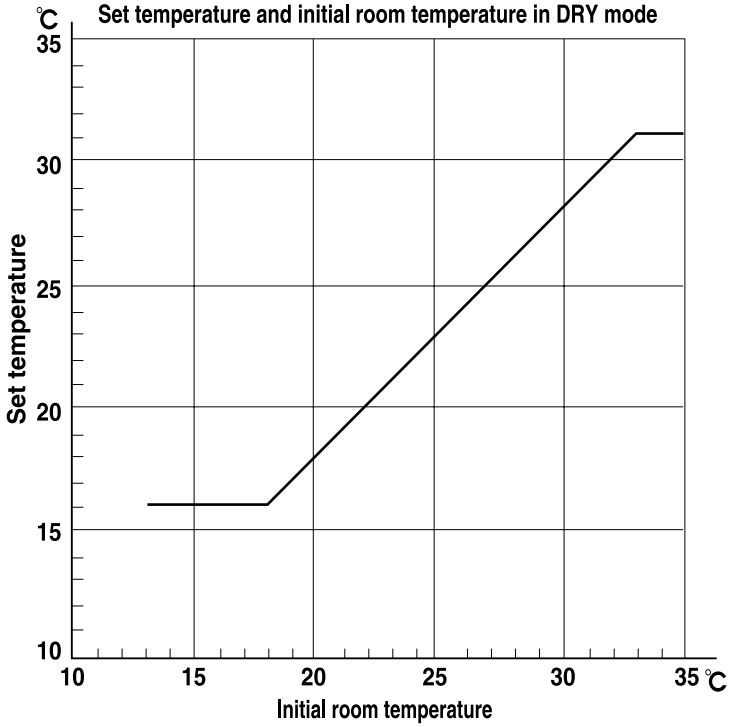
The operation is as same as coil frost prevention during COOL mode of "I FEEL CONTROL".
Indoor fan operates at the set speed and the compressor stops for 5minutes, because protection (Coil frost prevention)has the priority. However when coil frost prevention works while the compressor is not operating, it's speed becomes Low.

9-2. COOL (✿) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select COOL mode with the OPERATION SELECT button.
(3) Press the TEMPERATURE buttons. (TOO WARM or TOO COOL button) to select the desired temperature.
The setting range is 16 ~ 31°C.
※ Indoor fan continues to operate regardless of thermostat's OFF-ON at set speed.
※ Coil frost prevention is as same as COOL mode of "I FEEL CONTROL".

9-3. DRY (△) OPERATION

(1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns on with a beep tone.
(2) Select DRY mode with the OPERATION SELECT button.
(3) The microprocessor reads the room temperature and determines the set temperature. Set temperature is as shown on the right chart.
Thermostat (SET TEMP.) does not work.
The other operations are same as DRY mode of "I FEEL CONTROL".



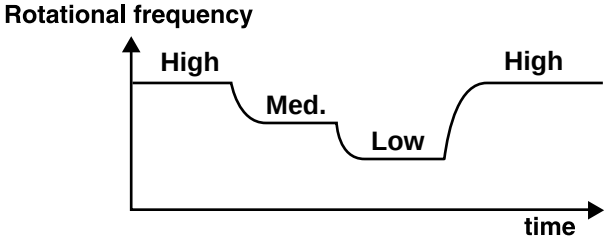
(4) DRY operation will not function when the room temperature is 13°C or below.

9-4.FAN(✿)OPERATION

(1) Press OPERATE/STOP(ON/OFF) button. OPERATION INDICATOR lamp of the indoor unit turns ON with a beep tone.
(2) Select FAN mode with the OPERATION SELECT button.
(3) Select the desired fan speed. When AUTO, it becomes Low.
Only indoor fan operates. Outdoor unit does not operate.

9-5. FAN MOTOR CONTROL

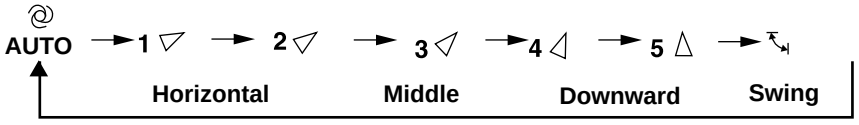
(1) Rotational frequency feedback control
The indoor fan motor is equipped with a rotational frequency sensor, and outputs signal to the microprocessor to feedback the rotational frequency. Comparing the current rotational frequency with the target rotational frequency (High,Med.,Low), the microprocessor controls IC141 and adjusts fan motor electric current to make the current rotational frequency close to the target rotational frequency. With this control, when the fan speed is switched, the rotational frequency changes smoothly.



(2) Fan motor lock-up protection
When the rotational frequency feedback signal has not output for 12 seconds, (or when the microprocessor cannot detect the signal for 12 seconds) the fan motor is regarded locked-up. Then the electric current to the fan motor is shut off. 3 minutes later, the electric current is applied to the fan motor again. During the fan motor lock-up, the OPERATION INDICATOR lamp flashes on and off to show the fan motor abnormality. (Refer to page 30.)

9-6. AUTO VANE OPERATION

(1) Vane motor drive
These models are equipped with a stepping motor for the horizontal vane. The rotating direction, speed, and angle of the motor are controlled by pulse signals (approx. 12V) transmitted from microprocessor.
(2) The horizontal vane angle and mode change as follows by pressing the VANE CONTROL button.



(3) Positioning

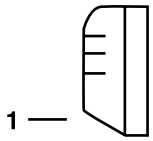
The vane is once pressed to the vane stopper below to confirm the standard position and then set to the desired angle. Confirming of standard position is performed in case of follows.

(a) When the OPERATE/STOP(ON/OFF) button is pressed(POWER ON/OFF).
(b) When the vane control is changed from AUTO to MANUAL.
(c) When the SWING is finished.
(d) When the test run starts.
(e) When the power supply turns ON.

(4) VANE AUTO ( ) mode

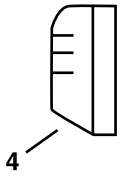
In VANE AUTO mode, the microprocessor automatically determines the horizontal vane angle and operation to make the optimum room-temperature distribution.

① In COOL and DRY operation



Vane angle is fixed to Angle 1.

② In FAN operation



Vane angle is fixed to Angle 4.

(5) STOP (operation OFF) and ON-TIMER standby.

When the following cases occur, the horizontal vane returns to the closed position.

(a) When the OPERATE/STOP(ON/OFF) button is pressed (POWER OFF).
(b) When the operation is stopped by the emergency operation.
(c) When the ON-TIMER is on standby.

(6) Dew prevention

During COOL or DRY operation at Vane Angle 4 or 5 when the compressor cumulative operation time exceeds 1 hour, the vane angle automatically changes to Angle 1 for dew prevention.

(7) SWING MODE ( )

By selecting SWING mode with the VANE CONTROL button, the horizontal vane swings vertically. The remote controller displays " ".

(8) ECONO COOL ( ) operation (ECONOmical operation)

When the ECONO COOL button is pressed in COOL mode, set temperature is automatically set 2°C higher than that in COOL mode.

Also the horizontal vane swings in various cycle according to the temperature of indoor heat exchanger(RT12).

SWING operation makes you feel cooler than set temperature. So, even though the set temperature is higher than that in COOL mode, the air conditioner can keep comfort. As a result, energy can be saved.

ECONO COOL operation is cancelled when the ECONO COOL button is pressed once again or VANE CONTROL button is pressed or change to other operation mode.

NOTE : ECONO COOL operation not work in COOL mode of "I FEEL CONTROL".

SWING operation

In swing operation of ECONO COOL operation air flow is initially blew out upward(levelly).

According to the temperature of indoor coil thermistor RT12 at starting of this operation, next downward blow time is decided. Then when the downward blow has been finished, next upward blow time is decided.

For initial 10 minutes the swing operation is performed in table G~H for quick cooling(but G : RT 12 is 24℃ or less).

Also, after 10 minutes when the difference of set temperature and room temperature is more than 2℃, the swing operation is performed in table D~H for more cooling(but D: RT12 is 20℃ or less).

The air conditioner repeats the swing operation in various cycle as follows.

	Temperature of indoor coil thermistor RT12	Downward blow time (sec.)	Upward(level) blow time (sec.)
A	15°C or less	2	23
B	15°C to 17°C	5	20
C	17°C to 18°C	8	17
D	18°C to 20°C	11	14
E	20°C to 21°C	14	11
F	21°C to 22°C	17	8
G	22°C to 24°C	20	5
H	more than 24°C	23	2

9-7. TIMER OPERATION

1. How to set the timer

(1) Press OPERATE/STOP(ON/OFF) button to start the air conditioner.

(2) Check that the current time is set correctly.

NOTE : Timer operation will not work without setting the current time. Initially “AM0:00” blinks at the current time display of TIMER MONITOR, so set the current time correctly with CLOCK SET button.

(3) Press ON/OFF TIMER buttons to select the operation.

“ON-TIMER” button... AUTO START operation (ON timer)

“OFF-TIMER” button... AUTO STOP operation (OFF timer)

(4) Press HR. and MIN. button (TIME set button) to set the timer. Time setting is 10-minute units.

HR. and MIN. button will work when “ ◴→| ” or “ ◴→◯ ” mark is flashing.

These marks disappear in 1 minute.

After setting the ON timer, check that OPERATION INDICATOR lamp of the indoor unit lights.

NOTE1 : Be sure to place the remote controller at the position where its signal can reach the air conditioner even during TIMER operation, or the set time may deviate within the range of about 10 minutes.

NOTE2 : Reset the timer in the following cases, or the set time may deviate and other malfunctions may occur.

- A power failure occurs.
- The circuit breaker functions.

2. Cancel

TIMER setting can be cancelled with the ON/OFF TIMER buttons.

To cancel the ON timer, press the “ON-TIMER” button.

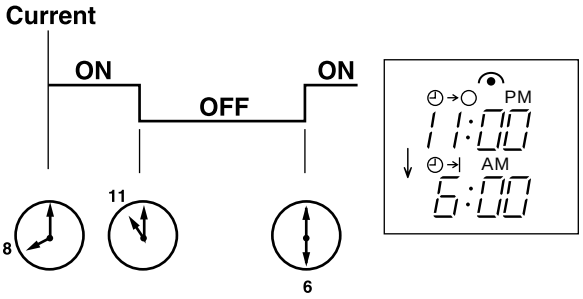
To cancel the OFF timer, press the “OFF-TIMER” button.

TIMER is cancelled and the display of set time disappears.

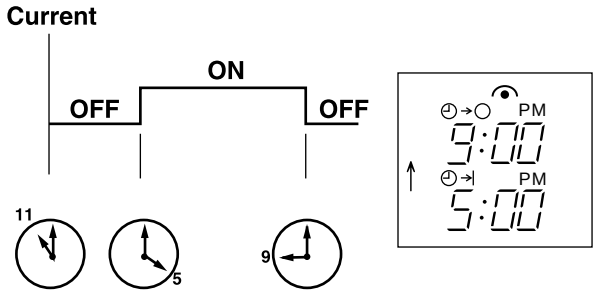
PROGRAM TIMER

- The OFF timer and ON timer can be used in combination.
- “ ↑ ”and “ ↓ ” display shows the order of the OFF timer and ON timer operation.

(Example 1) The current time is 8:00 PM.
The unit turns off at 11:00 PM, and on at 6:00 AM.



(Example 2) The current time is 11:00 AM.
The unit turns on at 5:00 PM, and off at 9:00 PM.

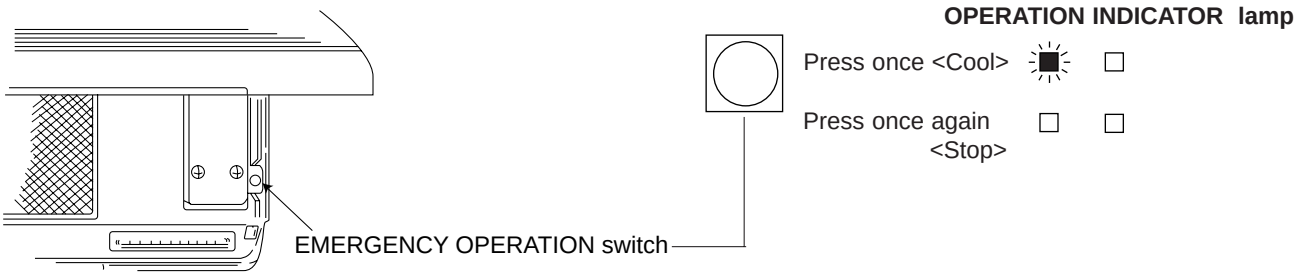


NOTE : TIMER setting will be cancelled by power failure or breaker functioning.

9-8. EMERGENCY-TEST OPERATION

In case of test run operation or emergency operation, use the EMERGENCY OPERATION switch on the front of the indoor unit. Emergency operation is available when the remote controller is missing, has failed or the batteries of remote controller run down. The unit will start and the OPERATION INDICATOR lamp will light.
The first 30 minutes of operation is the test run operation. This operation is for servicing. The indoor fan speed runs at High speed and the system is in continuous operation. (The thermostat is ON.)
After 30 minutes of test run operation the system shifts to EMERGENCY COOL MODE with a set temperature of 24°C. The fan speed shifts to Med. speed.
The coil frost prevention works even in emergency operation.
In the test run or emergency operation, the horizontal vane operates in VANE AUTO ( ) mode.
Emergency operation continues until the EMERGENCY OPERATION switch is pressed again or the unit receives any signal from the remote controller. In case of latter normal operation will start.

NOTE : Do not press the EMERGENCY OPERATION switch during normal operation.



10 SERVICE FUNCTIONS

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10-1. TIMER SHORT MODE

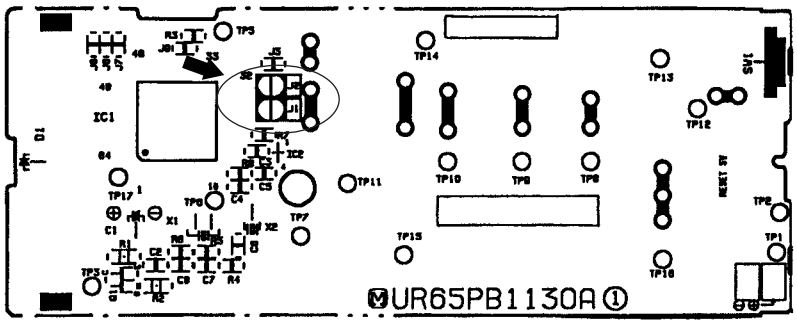
For service, set time can be shortened by short circuit of JPG and JPS the electronic control P.C. board.
The time will be shortened as follows. (Refer to page 36.)
Set time : 1 minute ➔ 1-second
Set time : 3 minute ➔ 3-second (It takes 3 minutes for the compressor to start operation. However, the starting time is shortened by short circuit of JPG and JPS.)

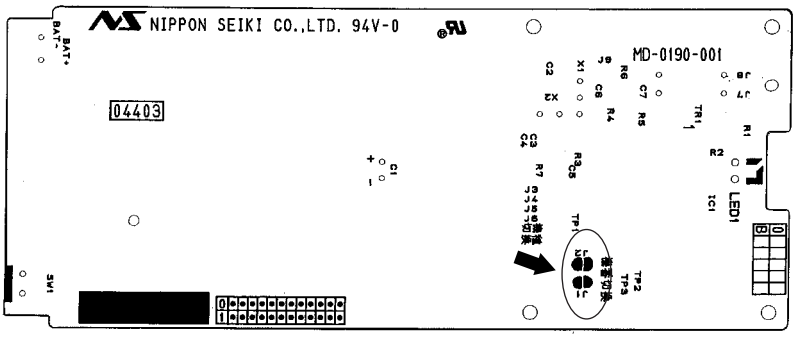
10-2. P.C. BOARD MODIFICATION FOR INDIVIDUAL OPERATION

A maximum of 4 indoor units with wireless remote controllers can be used in a room.
In this case, to operate each indoor unit individually by each remote controller, P.C. boards of remote controller must be modified according to the number of the indoor unit.

How to modify the remote controller P.C. board

Remove batteries before modification.
The board has a print as shown below :





NOTE : For remodelling, take out the batteries and push the OPERATE/STOP(ON/OFF) button twice or 3 times at first.
After finish remodelling, put back the batteries then push the RESET button.

The P.C. board has the print “J1” and “J2”. Solder “J1” and “J2” according to the number of indoor unit as shown in Table 1.
After modification, push the RESET button.

Table 1

	1 unit operation	2 units operation	3 units operation	4 units operation
No. 1 unit	No modification	Same as at left	Same as at left	Same as at left
No. 2 unit	–	Solder J1	Same as at left	Same as at left
No. 3 unit	–	–	Solder J2	Same as at left
No. 4 unit	–	–	–	Solder both J1 and J2

NOTE :

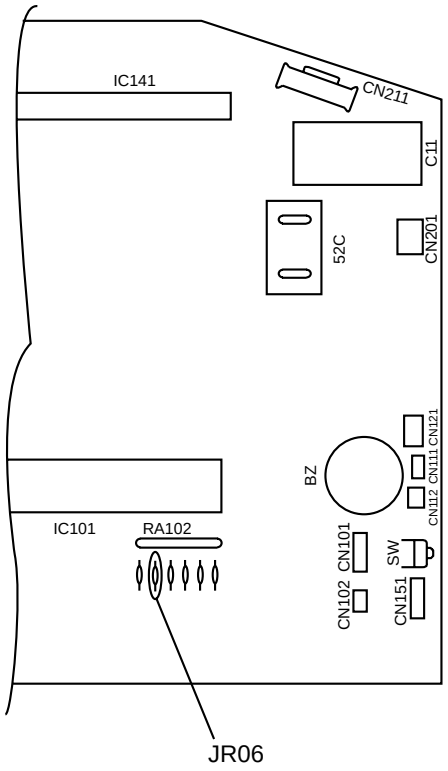
At power supply failure or installation, indoor unit deletes the memory about remote controller. When the power supply is turned on and indoor unit receives the first signals from the remote controller, the remote controller number is designated as the indoor unit number. Therefore at and after the second time indoor unit accepts the remote controller of the initial setting number.
At setting-error, turn the power supply off to cancel the individual operation and then turn the power supply on to restart the setting.

10-3. AUTO RESTART FUNCTION

When the indoor unit is controlled with the remote controller, the operation mode, set temperature, and the fan speed are memorized by the indoor electronic control P.C.board. The “AUTO RESTART FUNCTION” sets to work the moment power has restored after power failure. Then, the unit will restart automatically. However if the unit is operated in “I FEEL CONTROL.” mode before power failure, the operation is not memorized. In “I FEEL CONTROL.” mode, the operation is decided by the initial room temperature.

How to set “AUTO RESTART FUNCTION”

①Turn off the main power for the unit.
②Pull out the electronic control P.C. board and the display P.C.board. (Refer to page 37.)
③Cut the RESISTOR JR06 on the indoor electronic control P.C.board. (Refer to page 36.)



Operation

①If the main power (230V AC) has been cut, the operation settings remain.
②After the power is restored, the unit restarts automatically according to the memory.(However, it takes at least 3 minutes for the compressor to start running.)

NOTE:

- The operation settings are memorized when 10 seconds have passed after the indoor unit was operated with the remote controller.
- If main power is turned off or a power failure occurs while AUTO START/STOP timer is active, the timer setting is cancelled.
- If the unit has been off with the remote controller before power failure, the auto restart function does not work as the power button of the remote controller is off.
- To prevent breaker off due to the rush of starting current, systematize other home appliances not to turn on at the same time.
- When some air conditioners are connected to the same supply system, if they are operated before power failure, the starting current of all the compressors may flow simultaneously at restart.
  Therefore, the special counter-measures are required to prevent the main voltage-drop or the rush of the starting current by adding to the system that allows the units to start one by one.

11 TROUBLESHOOTING

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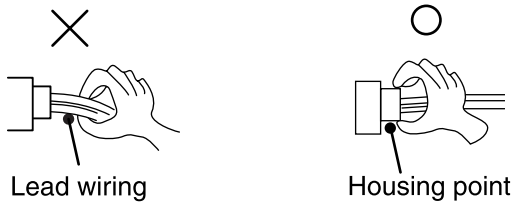
11-1. Cautions on troubleshooting

1. Before troubleshooting, check the following:

1) Check the power supply voltage.
2) Check the indoor/outdoor connecting wire for mis-wiring.

2. Take care the following during servicing.

1) Before servicing the air conditioner, be sure to first turn off the remote controller to stop the unit, and then after confirming the horizontal vane is closed, turn off the breaker and / or disconnect the power plug.
2) Be sure to turn OFF the power supply before removing the front panel, the cabinet, the top panel and the electronic control P.C. board.
3) When removing the electronic control P.C. board, hold the edge of the board with care NOT to apply stress on the components.
4) When connecting or disconnecting the connectors, hold the housing of the connector. DO NOT pull the lead wires.



3. Troubleshooting procedure

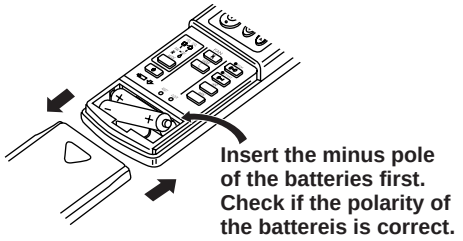
1) First, check if the OPERATION INDICATOR lamp on the indoor unit is flashing on and off to indicate an abnormality. To make sure, check how many times the abnormality indication is flashing on and off before starting service work.
2) Before servicing that the connector and terminal are connected properly.
3) If the electronic control P.C. board is supposed to be defective, check the copper foil pattern for disconnection and the components for bursting and discoloration.
4) When troubleshooting, refer to the flow chart and the check table on page 30.

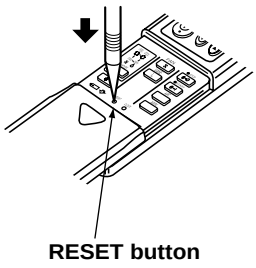
4. How to replace batteries

Weak batteries may cause the remote controller malfunction.
In this case, replace the batteries to operate the remote controller normally.

① Remove the front lid and insert batteries. Then reattach the front lid.

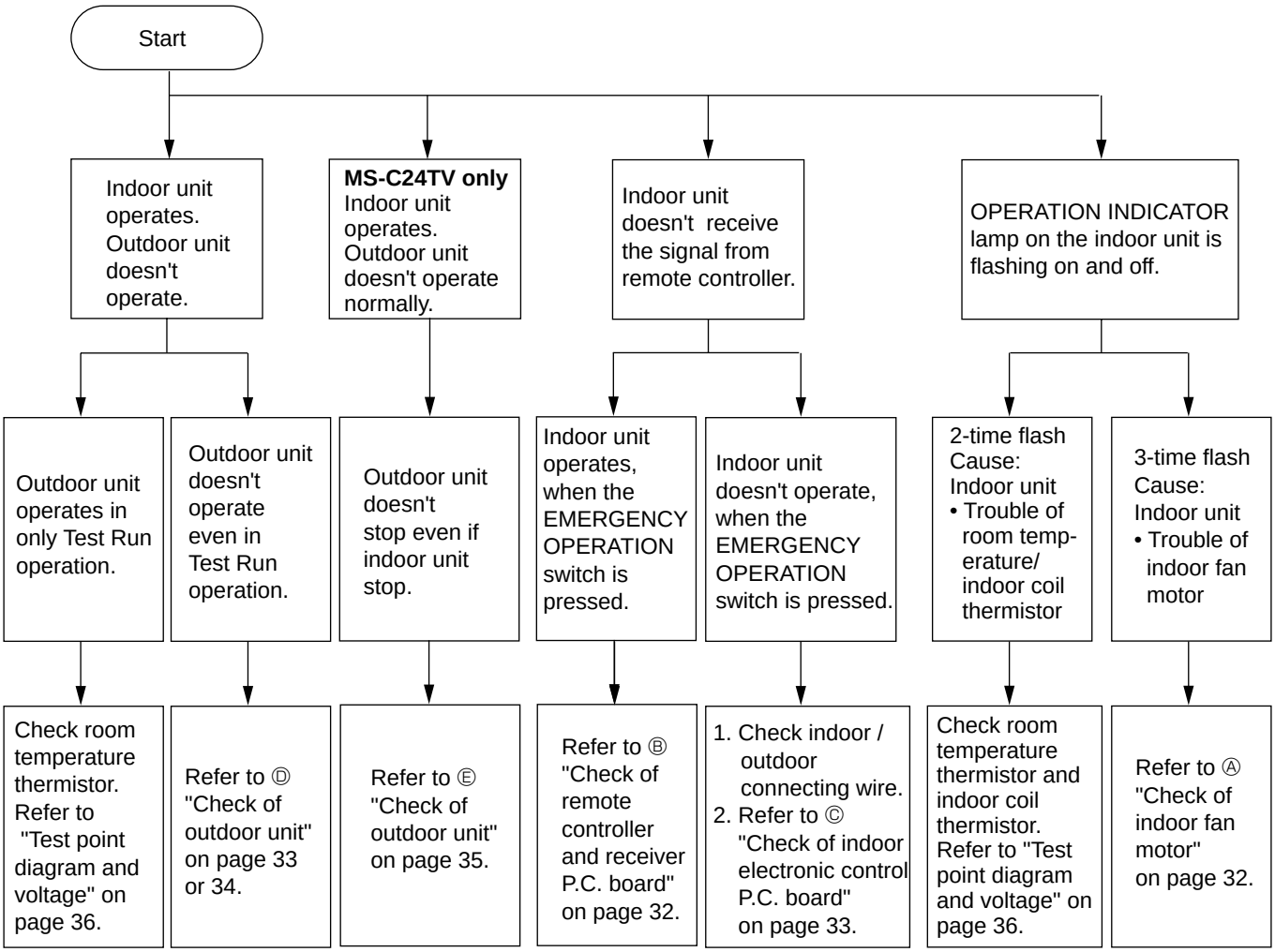
② Press the RESET button with tip end of ball point pen or the like, and then use the remote controller.



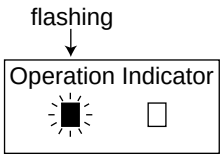


NOTE : If the RESET button is not pressed, the remote controller may not operate correctly.

11-2. Instruction of troubleshooting


Start
Indoor unit operates. Outdoor unit doesn't operate.
MS-C24TV only Indoor unit operates. Outdoor unit doesn't operate normally.
Indoor unit doesn't receive the signal from remote controller.
OPERATION INDICATOR lamp on the indoor unit is flashing on and off.
Outdoor unit operates in only Test Run operation.
Outdoor unit doesn't operate even in Test Run operation.
Outdoor unit doesn't stop even if indoor unit stop.
Indoor unit operates, when the EMERGENCY OPERATION switch is pressed.
Indoor unit doesn't operate, when the EMERGENCY OPERATION switch is pressed.
2-time flash Cause: Indoor unit • Trouble of room temperature/ indoor coil thermistor
3-time flash Cause: Indoor unit • Trouble of indoor fan motor
Check room temperature thermistor. Refer to "Test point diagram and voltage" on page 36.
Refer to Ⓓ "Check of outdoor unit" on page 33 or 34.
Refer to Ⓔ "Check of outdoor unit" on page 35.
Refer to Ⓑ "Check of remote controller and receiver P.C. board" on page 32.
1. Check indoor / outdoor connecting wire.
2. Refer to Ⓒ "Check of indoor electronic control P.C. board" on page 33.
Check room temperature thermistor and indoor coil thermistor. Refer to "Test point diagram and voltage" on page 36.
Refer to Ⓐ "Check of indoor fan motor" on page 32.

1. troubleshooting check table



· Flashing of the OPERATION INDICATOR lamp (on the left-hand side) indicates possible abnormalities.
· The OPERATION INDICATOR lamp (on the left-hand side) is lighting during normal operation.

Before taking measures, make sure that the symptom reappears for accurate troubleshooting.

Self check table

NO.	Abnormal point	Indication	Symptom	Detect method	Check point
1	Indoor coil thermistor Room temperature thermistor	2-time flash 2.5-second OFF	Outdoor unit does not run.	Detect Indoor coil/room temperature thermistor short or open circuit every 8 seconds during operation.	● Check thermistor calibration. ● Reconnect connector. ● Check indoor electronic control P.C. board.
2	Indoor fan motor	3-time flash 2.5-second OFF	Indoor fan motor repeats 12 seconds ON and 3 minutes OFF. When the indoor fan motor breaks, the fan keeps stopping.	When rotational frequency feedback signal is not emit during 12-second indoor fan operation	● Disconnect connector CN211 and then check connector CN121 ② - ③ to make sure rotational frequency feedback signal of 1.5V or over exists. ● Check indoor electronic control P.C. board. ● Check indoor fan motor. ● Reconnect connector.

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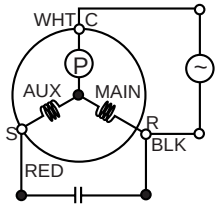
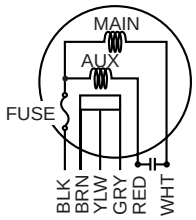
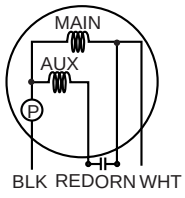
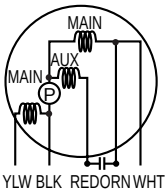
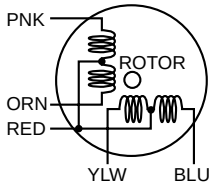
MS-C24TV -E1 MU-C24TV -E1

2. Trouble criterion of main parts

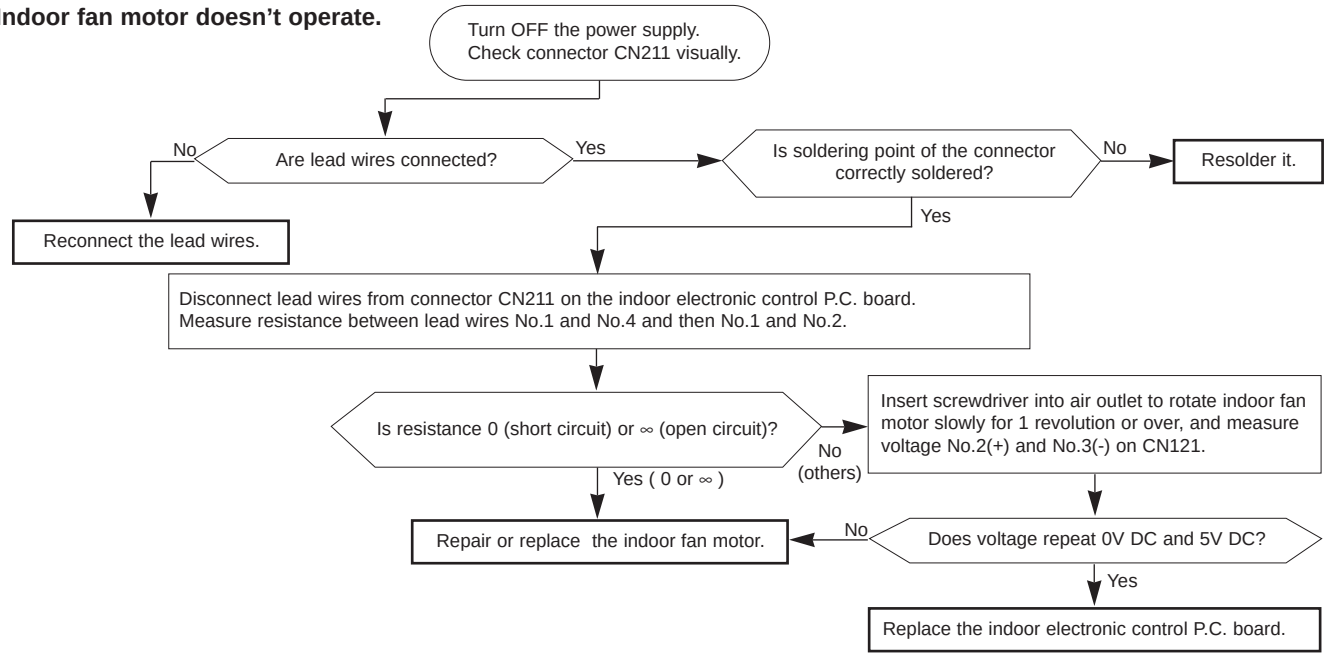
<table>
<tr><th>Part name</th><th>Check method and criterion</th><th>Figure</th></tr>
<tr><td>Room temperature thermistor(RT11)
Indoor coil thermistor(RT12)</td><td>Measure the resistance with a tester.
(Part temperature 10°C ~ 30°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>8kΩ ~ 20kΩ</td><td>Open or short-circuit</td></tr></table></td><td></td></tr>
<tr><td>Compressor (MC)</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)<table><tr><th rowspan="2"></th><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>C18TV</th><th>C24TV</th></tr><tr><td>C-R</td><td>0.95 ~ 1.17Ω</td><td>0.59 ~ 0.73Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>C-S</td><td>1.92 ~ 2.36Ω</td><td>1.78 ~ 2.18Ω</td></tr></table></td><td> 
</td></tr>
<tr><td rowspan="2">Indoor fan motor (MF)</td><td>Motor part
Measure the resistance between the terminals with a tester.
(Coil wiring temperature10°C ~ 30°C)<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>WHT-BLK</td><td>176 ~ 192Ω</td><td rowspan="2">Open or short-circuit</td></tr><tr><td>BLK-RED</td><td>240 ~ 261Ω</td></tr></table></td><td rowspan="2"> 
</td></tr>
<tr><td>Sensor part
Measure the voltage Power ON.<table><tr><th></th><th>Normal</th><th>Abnormal</th></tr><tr><td>BRN-YLW</td><td>4.5 ~ 5.5V</td><td rowspan="2">Remain 0V or 5V</td></tr><tr><td>YLW-GRY</td><td>(When fan revolved one time)
0V→5V→0V
(Approx.)</td></tr></table></td></tr>
<tr><td>Outdoor fan motor (MF)</td><td>Measure the resistance between the terminals with a tester.
(Coil wiring temperature –10°C ~ 40°C)<table><tr><th rowspan="2"></th><th colspan="2">Normal</th><th rowspan="2">Abnormal</th></tr><tr><th>C18TV</th><th>C24TV</th></tr><tr><td>WHT-BLK</td><td>102 ~ 126Ω</td><td>71 ~ 88Ω</td><td rowspan="3">Open or short-circuit</td></tr><tr><td>BLK-RED</td><td>97 ~ 120Ω</td><td>90 ~ 111Ω</td></tr><tr><td>BLK-YLW</td><td>–</td><td>81 ~ 100Ω</td></tr></table></td><td>MS-C18TV
 

MS-C24TV
 
</td></tr>
<tr><td>Vane motor (MV)</td><td>Measure the resistance between the terminals with a tester.
(Part temperature10°C ~ 30°C)<table><tr><th>Normal</th><th>Abnormal</th></tr><tr><td>358 ~ 388Ω</td><td>Open or short-circuit</td></tr></table></td><td> 
</td></tr>
</table>

Ⓟ INNER PROTECTOR

Ⓐ Check of indoor fan motor

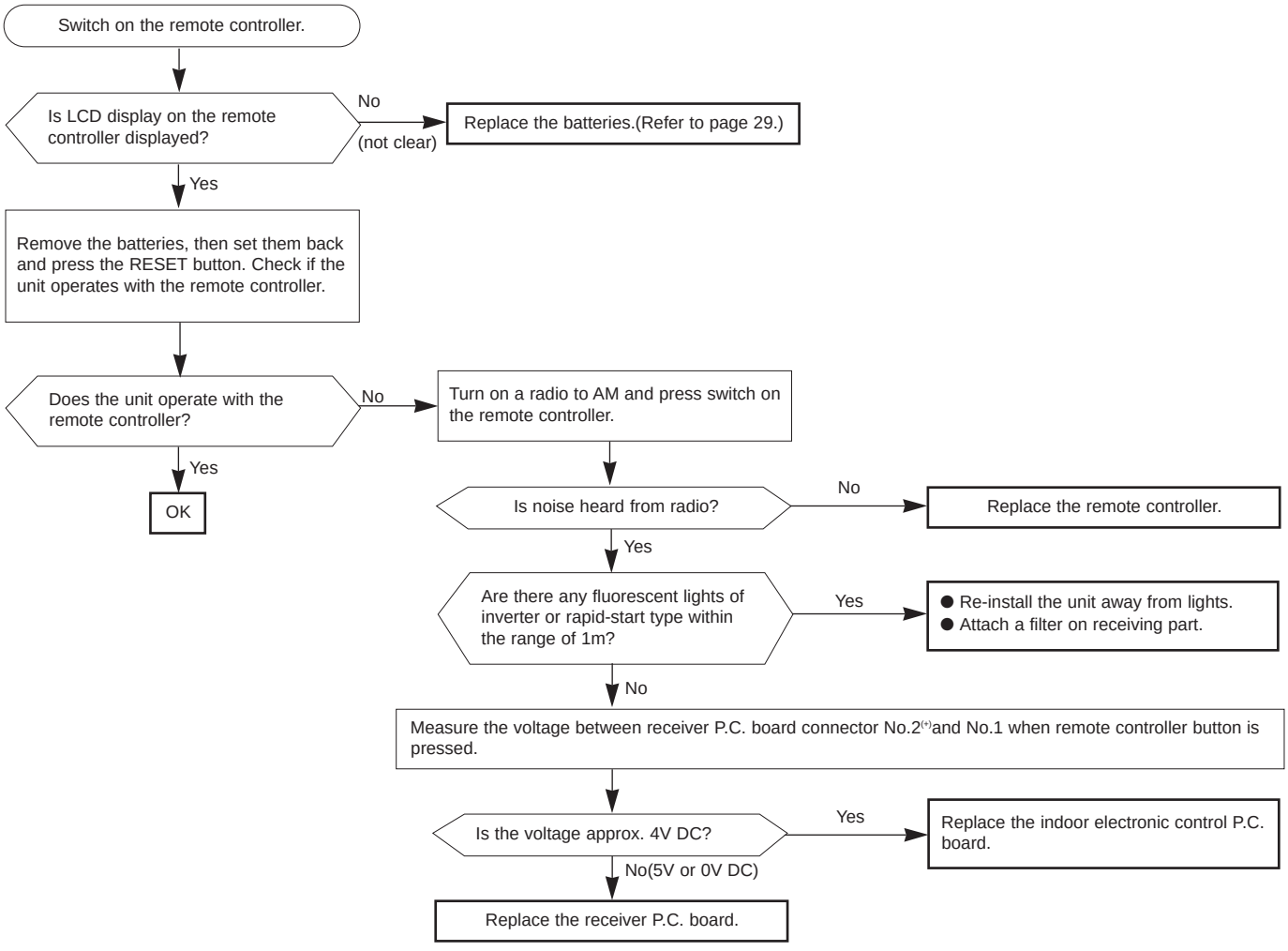
Indoor fan motor doesn't operate.


Turn OFF the power supply.
Check connector CN211 visually.
Are lead wires connected?
No
Yes
Reconnect the lead wires.
Is soldering point of the connector correctly soldered?
No
Resolder it.
Yes
Disconnect lead wires from connector CN211 on the indoor electronic control P.C. board.
Measure resistance between lead wires No.1 and No.4 and then No.1 and No.2.
Is resistance 0 (short circuit) or ∞ (open circuit)?
No (others)
Yes (0 or ∞)
Insert screwdriver into air outlet to rotate indoor fan motor slowly for 1 revolution or over, and measure voltage No.2(+) and No.3(-) on CN121.
Repair or replace the indoor fan motor.
No
Does voltage repeat 0V DC and 5V DC?
Yes
Replace the indoor electronic control P.C. board.

Ⓑ Check of remote controller and receiver P.C. board

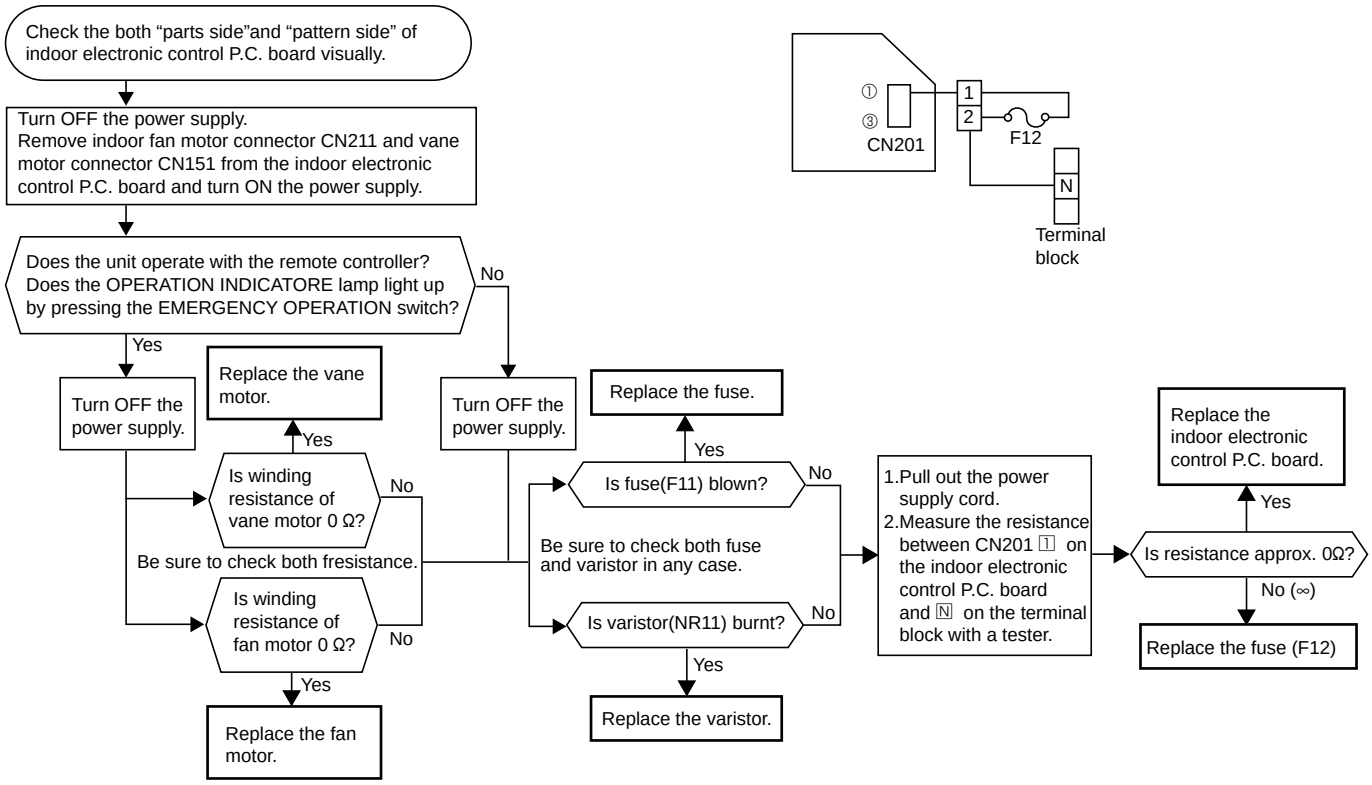
Indoor unit operates by pressing the EMERGENCY OPERATION switch, but doesn't operate with the remote controller.

※Check if the remote controller is exclusive for this air conditioner.


Switch on the remote controller.
Is LCD display on the remote controller displayed?
No (not clear)
Replace the batteries.(Refer to page 29.)
Yes
Remove the batteries, then set them back and press the RESET button. Check if the unit operates with the remote controller.
Does the unit operate with the remote controller?
No
Yes
OK
Turn on a radio to AM and press switch on the remote controller.
Is noise heard from radio?
No
Replace the remote controller.
Yes
Are there any fluorescent lights of inverter or rapid-start type within the range of 1m?
Yes
● Re-install the unit away from lights.
● Attach a filter on receiving part.
No
Measure the voltage between receiver P.C. board connector No.2(+) and No.1 when remote controller button is pressed.
Is the voltage approx. 4V DC?
Yes
Replace the indoor electronic control P.C. board.
No(5V or 0V DC)
Replace the receiver P.C. board.

ⓒCheck of indoor electronic control P.C. board

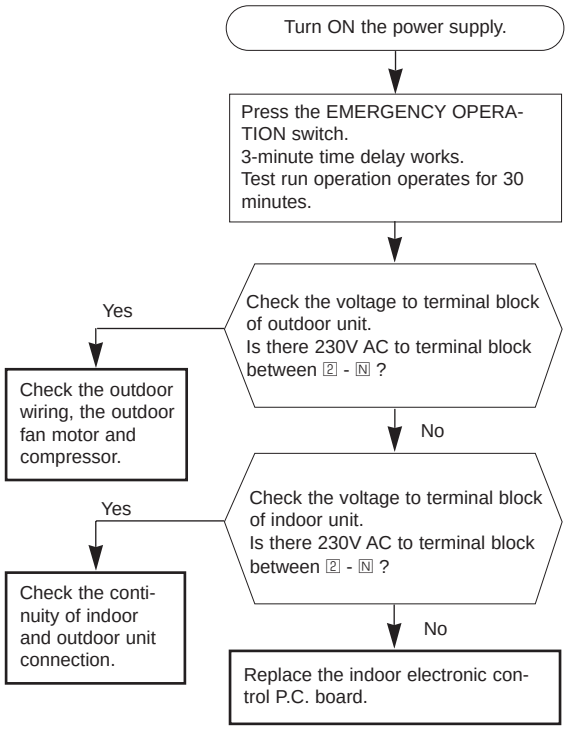
The unit doesn't operate with the remote controller.
Also, the OPERATION INDICATOR lamp doesn't light up by pressing the EMERGENCY OPERATION switch.


Check the both "parts side"and "pattern side" of indoor electronic control P.C. board visually.
Turn OFF the power supply.
Remove indoor fan motor connector CN211 and vane motor connector CN151 from the indoor electronic control P.C. board and turn ON the power supply.
Does the unit operate with the remote controller?
Does the OPERATION INDICATORE lamp light up by pressing the EMERGENCY OPERATION switch?
No
Yes
Turn OFF the power supply.
Replace the vane motor.
Yes
Is winding resistance of vane motor 0 Ω?
No
Be sure to check both fresistance.
Is winding resistance of fan motor 0 Ω?
No
Yes
Replace the fan motor.
Turn OFF the power supply.
Replace the fuse.
Yes
Is fuse(F11) blown?
No
Be sure to check both fuse and varistor in any case.
Is varistor(NR11) burnt?
No
Yes
Replace the varistor.
1.Pull out the power supply cord.
2.Measure the resistance between CN201 1 on the indoor electronic control P.C. board and N on the terminal block with a tester.
Is resistance approx. 0Ω?
Yes
Replace the indoor electronic control P.C. board.
No (∞)
Replace the fuse (F12)
CN201
F12
Terminal block
N

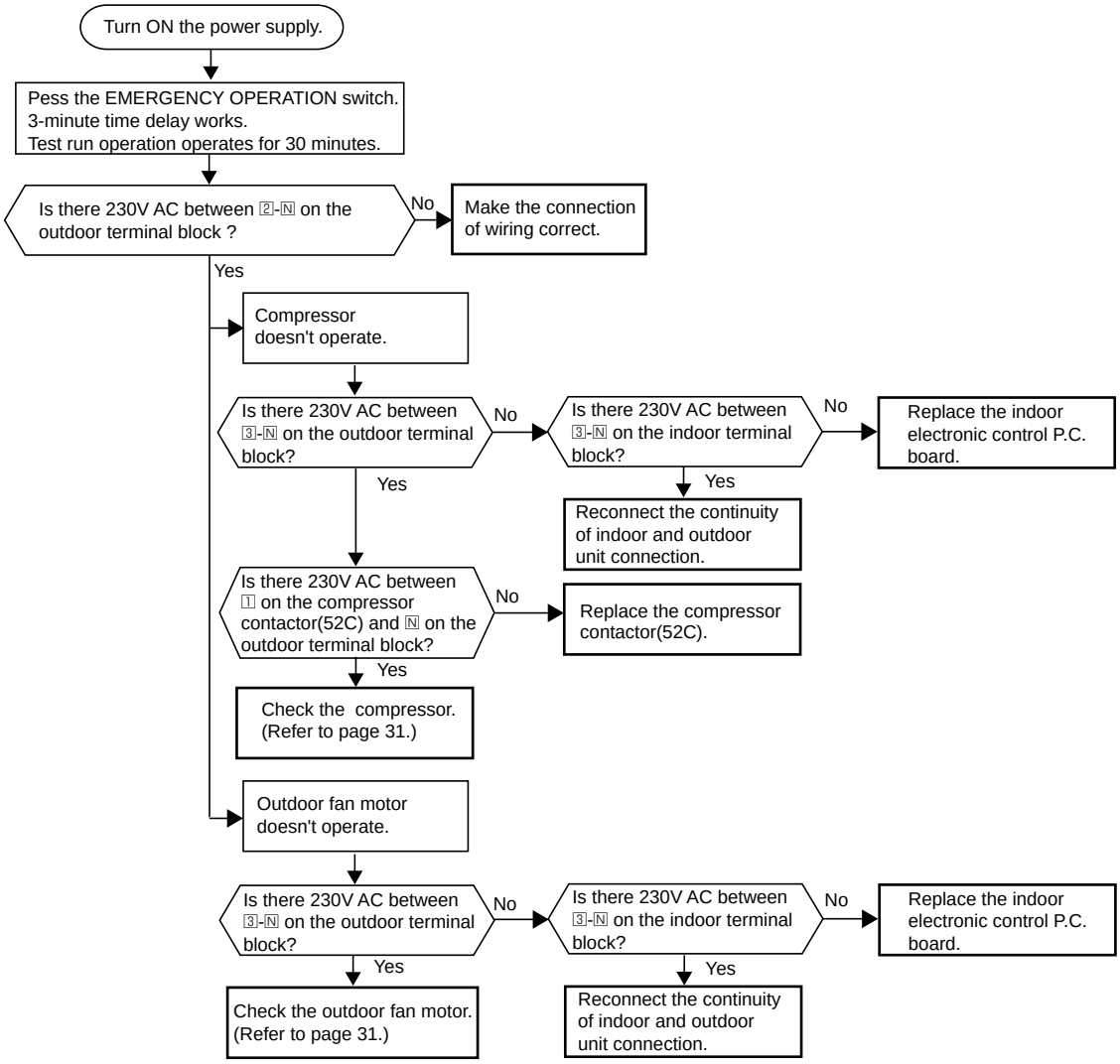
ⒹCheck of outdoor unit

Compressor and / or outdoor fan motor doesn't operate.

MS-C18TV

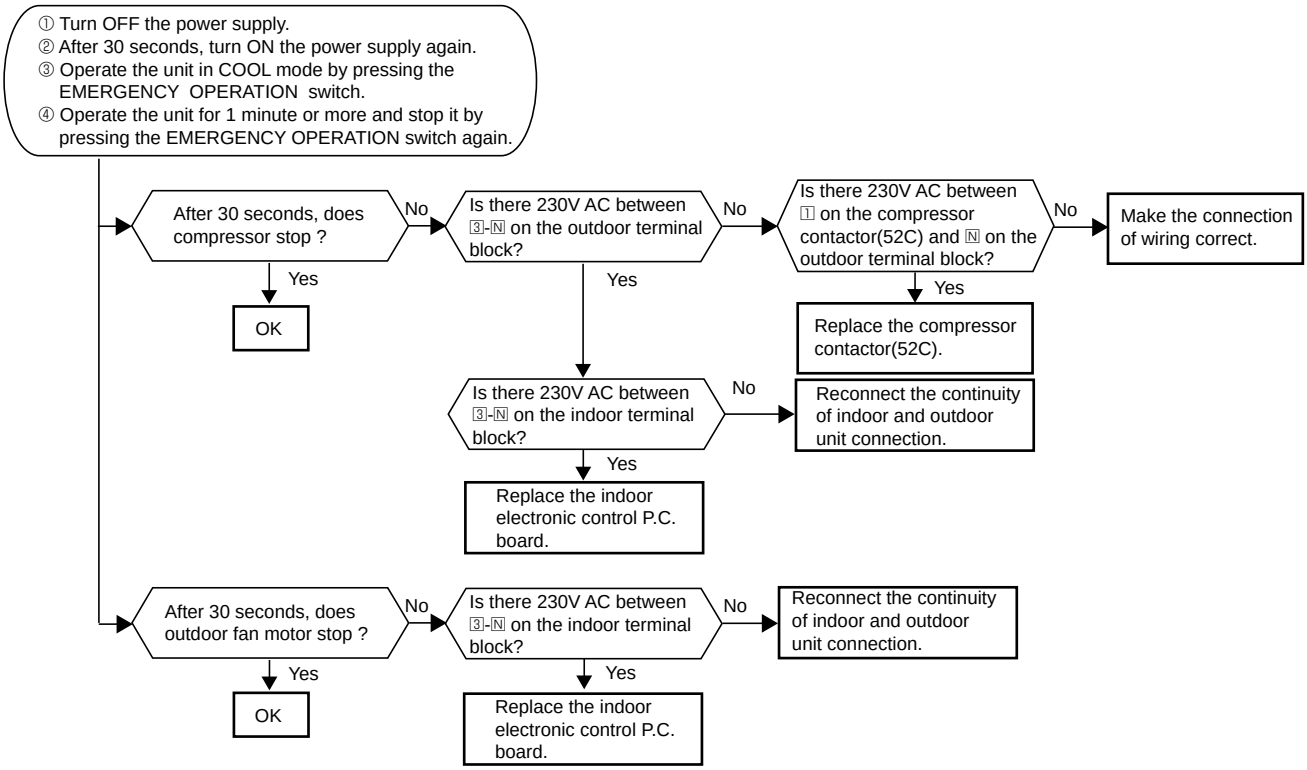

Turn ON the power supply.
Press the EMERGENCY OPERATION switch.
3-minute time delay works.
Test run operation operates for 30 minutes.
Check the voltage to terminal block of outdoor unit.
Is there 230V AC to terminal block between 2 - N ?
Yes
Check the outdoor wiring, the outdoor fan motor and compressor.
No
Check the voltage to terminal block of indoor unit.
Is there 230V AC to terminal block between 2 - N ?
Yes
Check the continuity of indoor and outdoor unit connection.
No
Replace the indoor electronic control P.C. board.

MS-C24TV


Turn ON the power supply.
Pess the EMERGENCY OPERATION switch.
3-minute time delay works.
Test run operation operates for 30 minutes.
Is there 230V AC between 2-N on the outdoor terminal block ?
No
Make the connection of wiring correct.
Yes
Compressor doesn't operate.
Is there 230V AC between 3-N on the outdoor terminal block?
No
Is there 230V AC between 3-N on the indoor terminal block?
No
Replace the indoor electronic control P.C. board.
Yes
Yes
Reconnect the continuity of indoor and outdoor unit connection.
Is there 230V AC between 1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Replace the compressor contactor(52C).
Yes
Check the compressor. (Refer to page 31.)
Outdoor fan motor doesn't operate.
Is there 230V AC between 3-N on the outdoor terminal block?
No
Is there 230V AC between 3-N on the indoor terminal block?
No
Replace the indoor electronic control P.C. board.
Yes
Yes
Check the outdoor fan motor. (Refer to page 31.)
Reconnect the continuity of indoor and outdoor unit connection.

Ⓔ Check of outdoor unit <MS-C24TV only>

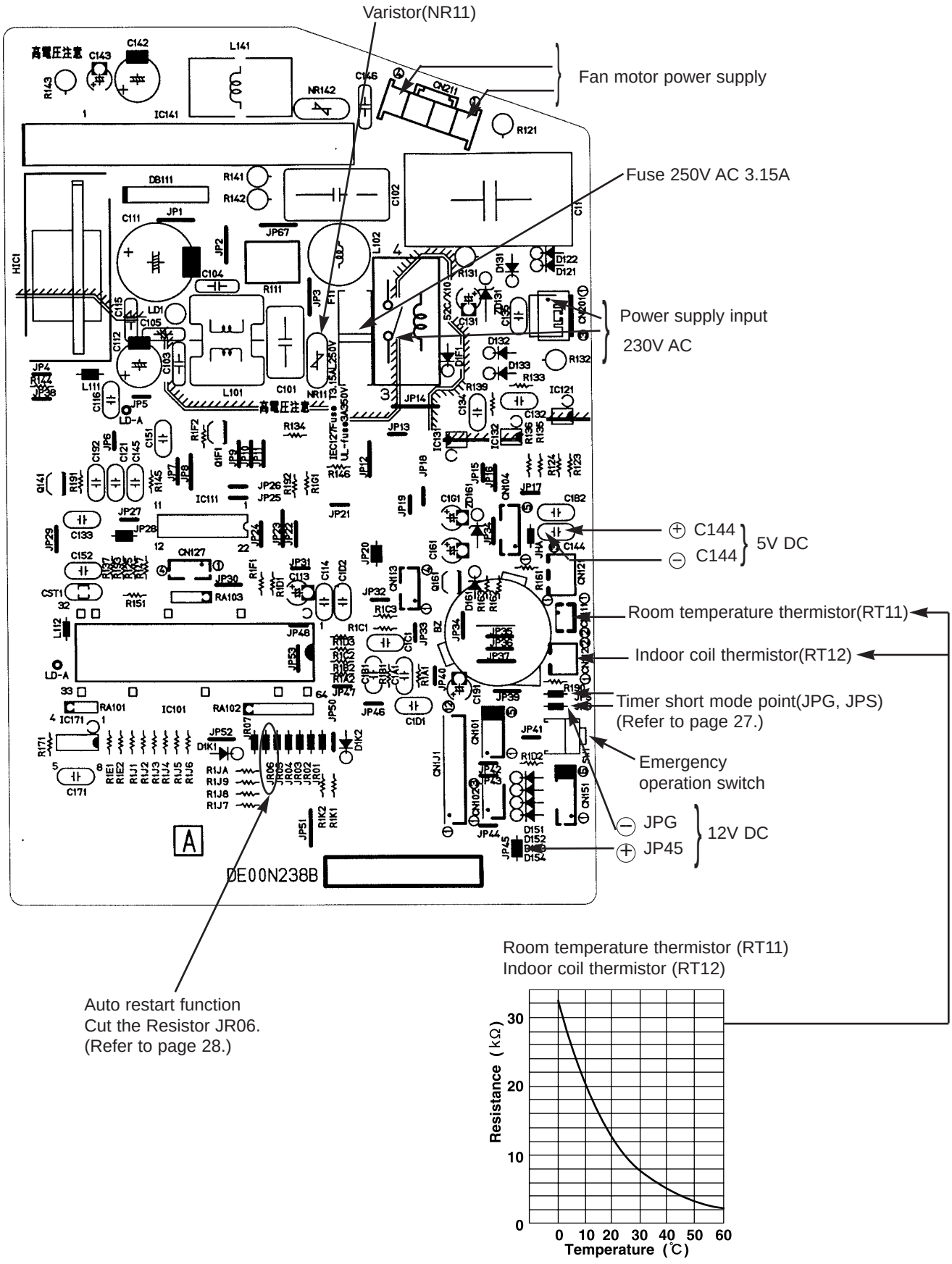
Compressor and / or outdoor fan motor doesn't stop.


① Turn OFF the power supply.
② After 30 seconds, turn ON the power supply again.
③ Operate the unit in COOL mode by pressing the EMERGENCY OPERATION switch.
④ Operate the unit for 1 minute or more and stop it by pressing the EMERGENCY OPERATION switch again.
After 30 seconds, does compressor stop ?
No
Yes
OK
Is there 230V AC between 3-N on the outdoor terminal block?
No
Yes
Is there 230V AC between 1 on the compressor contactor(52C) and N on the outdoor terminal block?
No
Yes
Make the connection of wiring correct.
Replace the compressor contactor(52C).
Is there 230V AC between 3-N on the indoor terminal block?
No
Yes
Reconnect the continuity of indoor and outdoor unit connection.
Replace the indoor electronic control P.C. board.
After 30 seconds, does outdoor fan motor stop ?
No
Yes
OK
Is there 230V AC between 3-N on the indoor terminal block?
No
Yes
Reconnect the continuity of indoor and outdoor unit connection.
Replace the indoor electronic control P.C. board.

TEST POINT DIAGRAM AND VOLTAGE

MS-C18TV -E1 MS-C24TV -E1

Indoor electronic control P.C. board

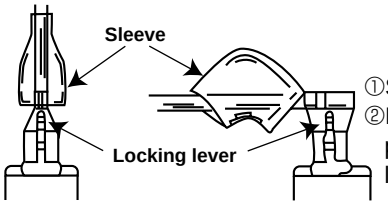


12 DISASSEMBLY INSTRUCTIONS

<"Terminal with lock mechanism" Detaching points>

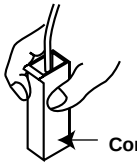
In case of terminal with lock mechanism, detach the terminal as shown below.
There are two types (Refer to (1) and (2)) of the terminal with lock mechanism.
The terminal with no lock mechanism can be removed by pulling it out.
Check the shape of the terminal and work.

(1) Slide the sleeve and check if there is a locking lever or not.



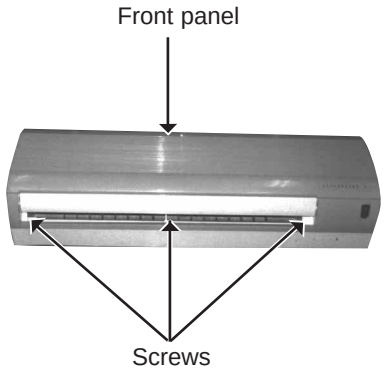
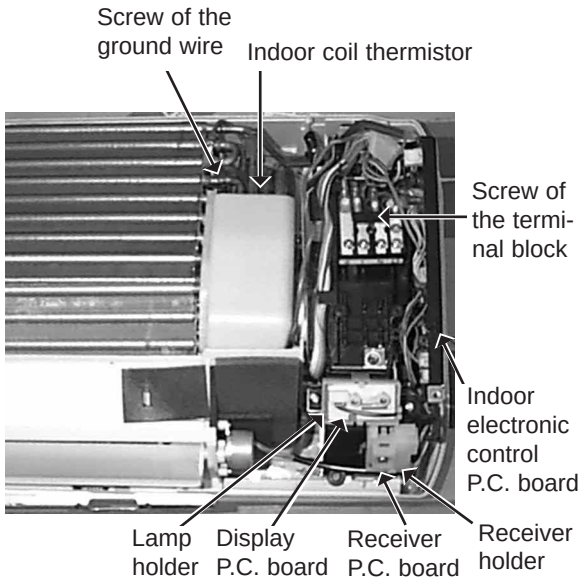
①Slide the sleeve.
②Pull the terminal while pushing the locking lever.

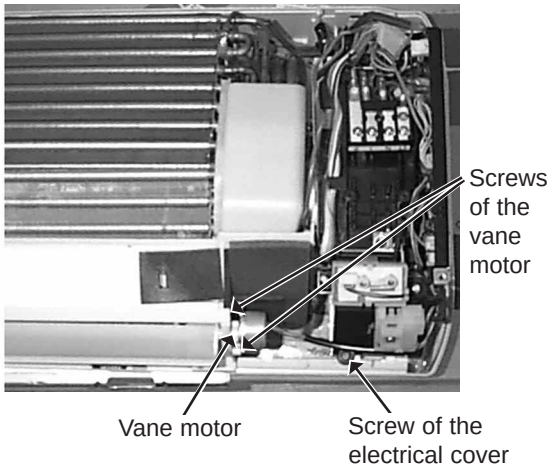
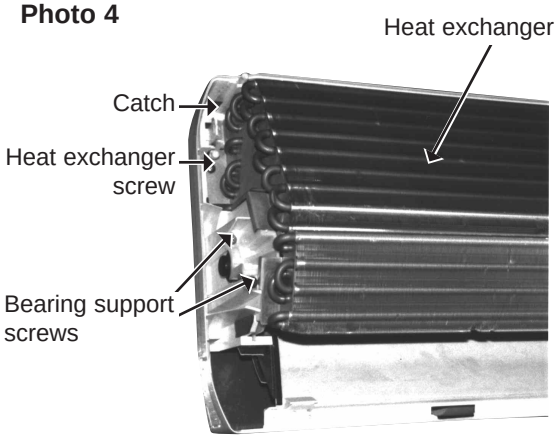
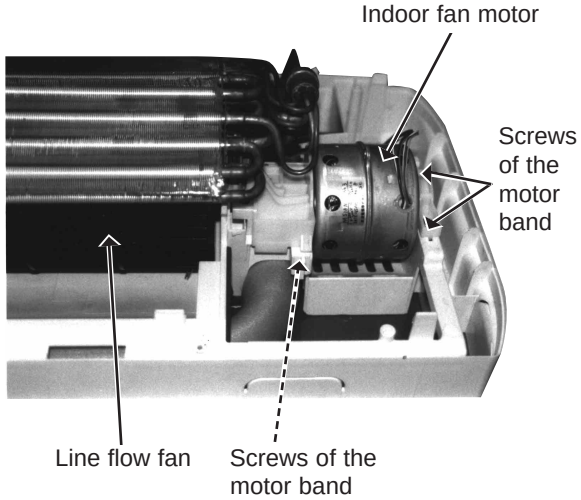
(2) The terminal with this connector is a terminal with lock mechanism.



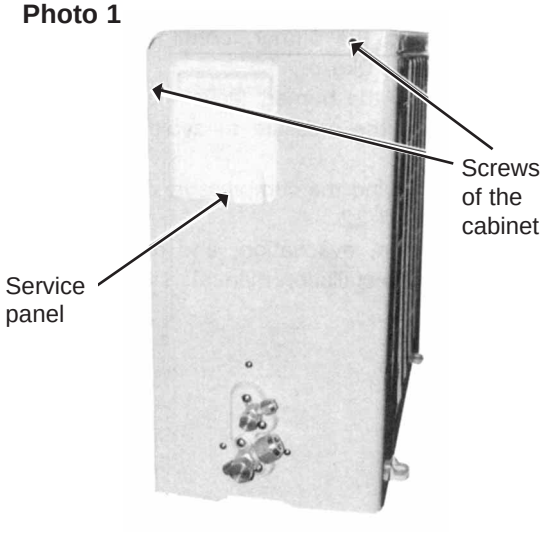
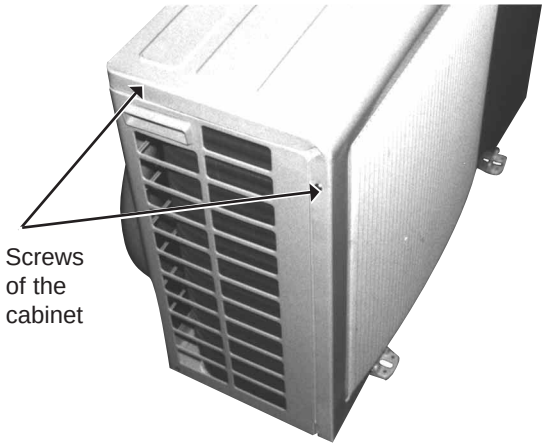
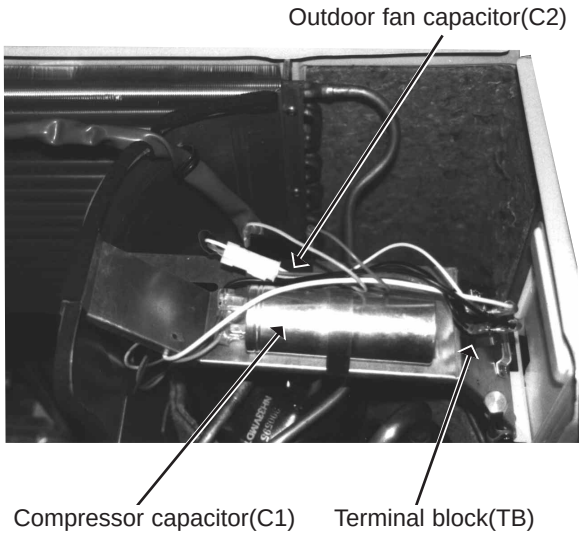
①Hold the sleeve, and pull out the terminal slowly.

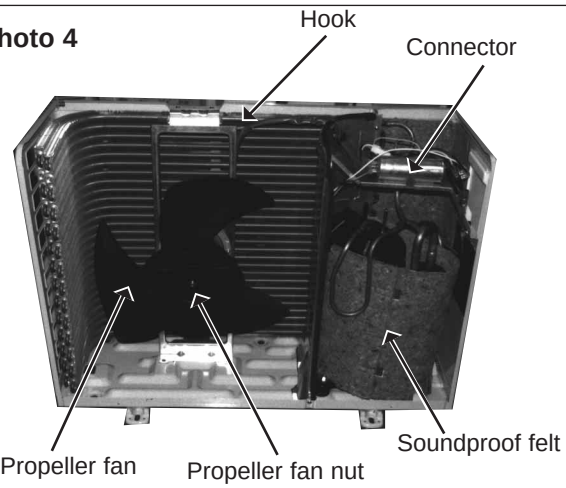
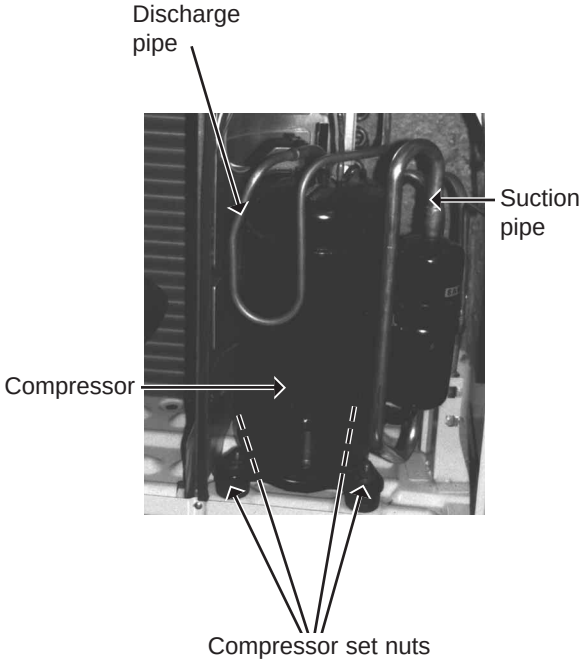
12-1. MS-C18TV -E1 MS-C24TV -E1 INDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the front panel (1) Remove the screw caps at the down of the front panel. Remove the screws. (2) Pull the panel down to your side slightly and unhook the catches at the top.	**Photo 1** 
2. Removing the electronic control P.C. board, the receiver P.C. board and the display P.C. board (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Remove the screw of the terminal cover. (4) Remove the screw of the terminal block. (5) Unhook the catch of the lamp holder. (6) Remove the receiver holder and the receiver P.C. board. (7) Remove the screw of the ground wire. (8) Disconnect all the connectors and all the lead wires on the electronic control P.C. board. (9) Remove the electronic control P.C. board and display P.C. board.	**Photo 2** 

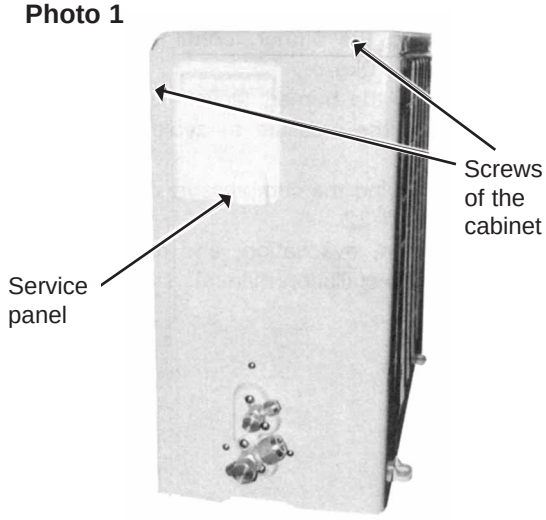
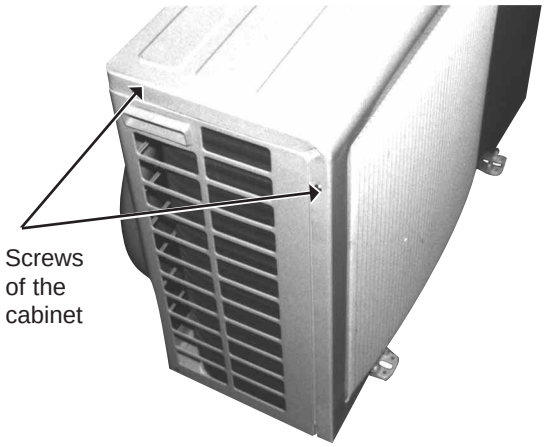
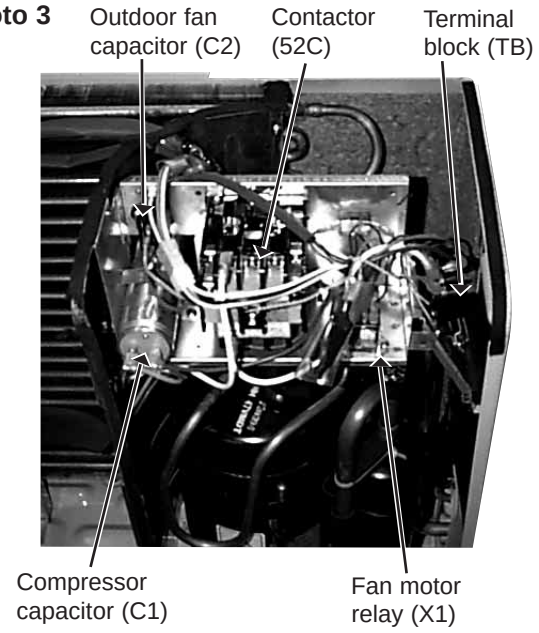
OPERATING PROCEDURE	PHOTOS
3. Removing the electrical box (1) Remove the front panel. (Refer to 1) (2) Remove the electrical cover. (3) Disconnect the connector of the indoor coil thermistor. (4) Disconnect the motor connector (CN211 and CN121) and the vane motor connector (CN151) on the electronic control P.C. board. (5) Remove the screw of the electrical box, remove the electrical box.	**Photo 3** 
4. Removing the vane motor (1) Remove the front panel. (Refer to 1) (2) Remove the electrical box. (Refer to 3) (3) Pull out the drain hose from the nozzle assembly, remove the nozzle assembly. (4) Remove the screws (both upper and lower) of the vane motor, disconnect the connector. (5) Remove the vane motor.	
5. Removing the indoor fan motor and the line flow fan (1) Remove the front panel. (2) Remove the electrical box. (3) Unhook the catches on the both sides of the nozzle assembly. (4) Remove the nozzle assembly. (5) Remove the screws of the bearing support. (6) Remove the screw of the heat exchanger unhook the catch. (7) Lifting the heat exchanger, remove the bearing support. (8) Loose the screw fixing the line flow fan, remove the line flow fan. (9) Remove the screws of the motor band, remove the fan motor.	**Photo 4**  **Photo 5** 

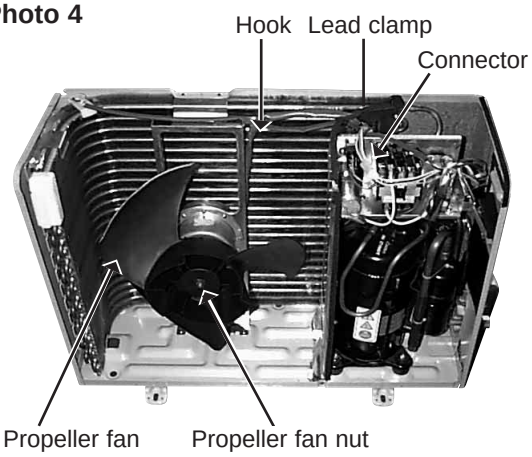
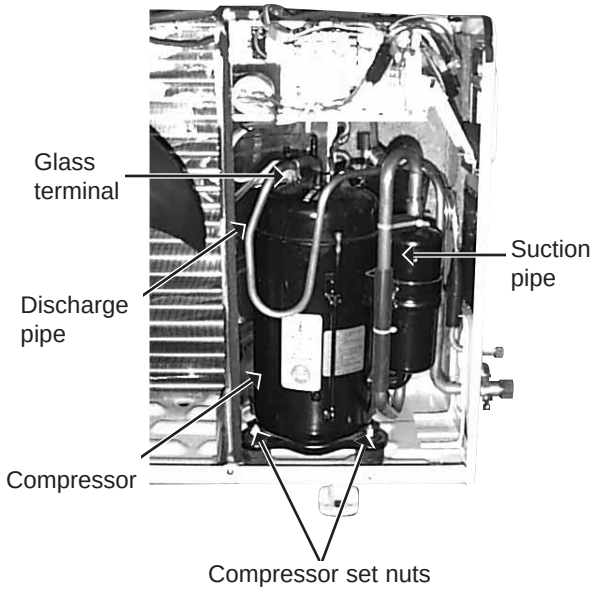
12-2. MU-C18TV - E1
OUTDOOR UNIT

OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on the both side to remove the cabinet.	**Photo 1**  **Photo 2** 
2. Removing the electrical parts (1) Remove the service panel and the cabinet. (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Terminal block (TB)	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector remove the hooked lead wire from the fan motor. (3) Remove the propeller fan nut and remove the propeller fan. (4) Remove screws fixing the fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1) (2) Remove the soundproof felt. (3) Remove the terminal cover on the compressor (4) Disconnect lead wires from the glass terminal of the compressor. (5) Recover gas from the refrigerant circuit. (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (8) Remove nuts fixing the compressor. (9) Remove the compressor. **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 5** 

12-3. MU-C24TV -E1
OUTDOOR UNIT

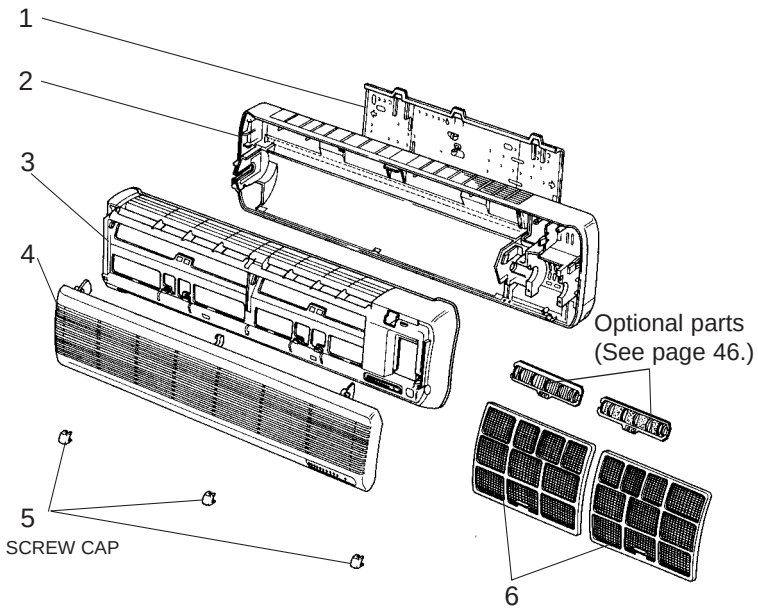
OPERATING PROCEDURE	PHOTOS
1. Removing the cabinet (1) Remove the screws of the cabinet. (2) Hold the bottom of the cabinet on the both side to remove the cabinet.	**Photo 1**  **Photo 2** 
2. Removing the electrical parts (1) Remove the service panel and cabinet. (2) Remove the following parts. •Compressor capacitor (C1) •Outdoor fan capacitor (C2) •Compressor contactor (52C) •Fan motor relay (X1) •Terminal block (TB)	**Photo 3** 

OPERATING PROCEDURE	PHOTOS
3. Removing the outdoor fan motor (1) Remove the cabinet. (Refer to 1) (2) Disconnect the connector and remove the lead wire from the fan motor. (3) Remove the propeller fan nut and remove the propeller fan. (4) Remove the screws fixing the fan motor. (5) Remove the fan motor.	**Photo 4** 
4. Removing the compressor (1) Remove the cabinet. (Refer to 1) (2) Remove the soundproof felt. (3) Remove the terminal cover on the compressor. (4) Disconnect lead wires from the glass terminal of the compressor. (5) Recover gas from the refrigerant circuit. (6) Disconnect the welded part of the discharge pipe. (7) Disconnect the welded part of the suction pipe. (7) Remove the nuts fixing the compressor. (8) Remove the compressor. **NOTE** ● Before using a burner, reclaim gas from the pipes until the pressure gauge shows 0 kg/cm^2 (MPa). ● Use the burner under the condition that gas can be recovered even when the inner pressure rises by heat.	**Photo 5** 

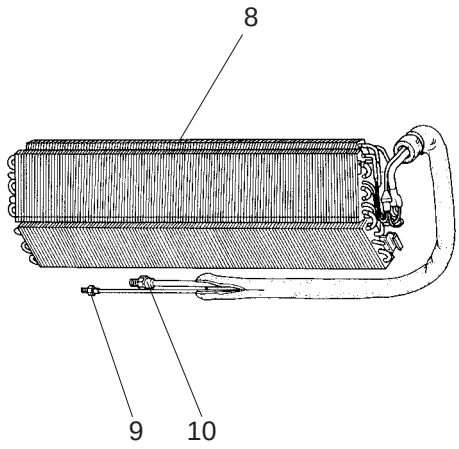
13 PARTS LIST

MS-C18TV -E1 (WH)
MS-C24TV -E1 (WH)

13-1. INDOOR UNIT STRUCTURAL PARTS



13-2. INDOOR UNIT HEAT EXCHANGER



13-1. INDOOR UNIT STRUCTURAL PARTS

Part number that is circled is not shown in the illustration.

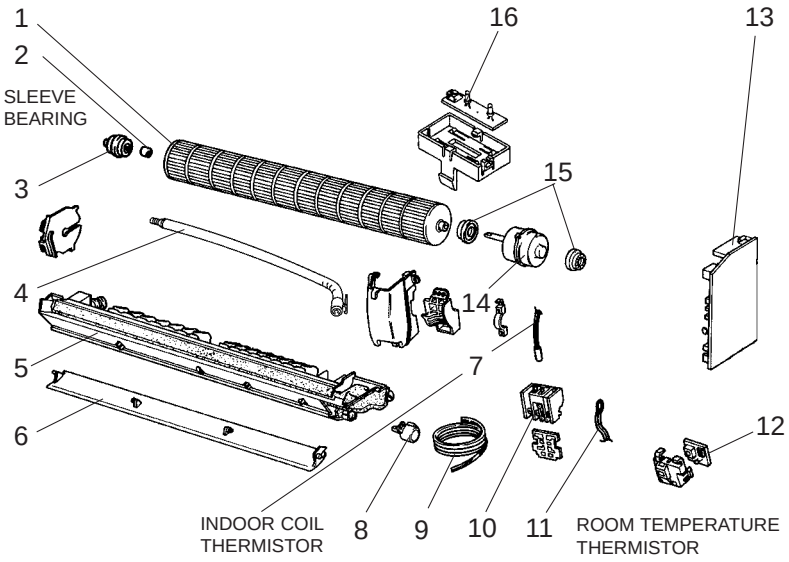
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MS-C18TV - E1 (WH)	MS-C24TV - E1 (WH)	
1	E02 141 970	INSTALLATION PLATE		1	1	
2	E02 143 234	BOX (WH)		1	1	
3	E02 138 000	FRONT PANEL ASSEMBLY(WH)		1	1	Including 4,5,7
4	E02 138 010	GRILLE (WH)		1	1	
5	E02 143 067	SCREW CAP (WH)		3	3	3PCS/SET
6	E02 141 100	AIR FILTER		2	2	
⑦	E02 516 007	LAMP PANEL (WH)		1	1	

13-2. INDOOR UNIT HEAT EXCHANGER

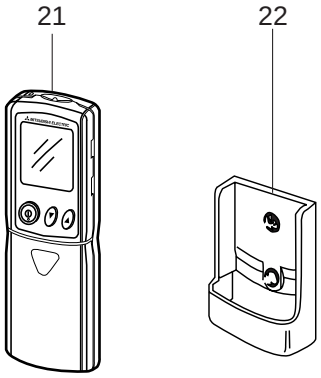
8	E02 141 620	INDOOR HEAT EXCHANGER		1	1	
9	E02 138 667	UNION(LIQUID)		1		ϕ6.35
	E02 176 667	UNION(LIQUID)			1	ϕ9.52
10	E02 138 666	UNION(GAS)		1	1	ϕ15.88

MS-C18TV - E1 (WH)
MS-C24TV - E1 (WH)

13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS



13-4. ACCESSORY PART AND REMOTE CONTROLLER



13-3. INDOOR UNIT ELECTRICAL PARTS AND FUNCTIONAL PARTS

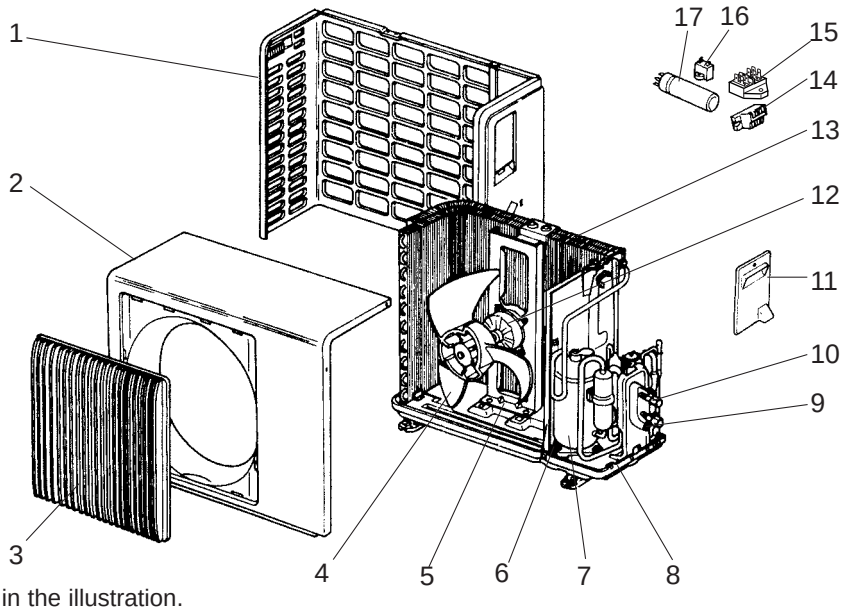
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MS-C18TV - E1 (WH)	MS-C24TV - E1 (WH)	
1	E02 141 302	LINE FLOW FAN		1	1	
2	E02 001 504	SLEEVE BEARING		1	1	
3	E02 141 509	BEARING MOUNT		1	1	
4	E02 408 702	DRAIN HOSE		1	1	
5	E02 143 235	NOZZLE (WH)		1	1	
6	E02 143 040	VANE (WH)		1	1	
7	E02 138 307	INDOOR COIL THERMISTOR	RT12	1	1	
8	E02 141 303	VANE MOTOR	MV	1	1	
9	E02 138 395	POWER SUPPLY CORD		1		
	E02 320 395	POWER SUPPLY CORD			1	
10	E02 611 375	TERMINAL BLOCK	TB	1		
	E02 612 375	TERMINAL BLOCK	TB		1	
11	E02 138 308	ROOM TEMPERATURE THERMISTOR	RT11	1	1	
12	E02 141 468	RECEIVER P. C. BOARD		1	1	
13	E02 611 452	ELECTRONIC CONTROL P.C. BOARD		1		AUTO RESTART
	E02 612 452	ELECTRONIC CONTROL P.C. BOARD			1	AUTO RESTART
14	E02 141 300	INDOOR FAN MOTOR	MF	1		RA4V27 - □□
	E02 213 300	INDOOR FAN MOTOR	MF		1	RA4V27 - □□
15	E02 001 505	FAN MOTOR RUBBER MOUNT		2	2	2PCS/SET
16	E02 138 329	DISPLAY P.C. BOARD		1	1	
⑰	E02 336 385	VARISTOR	NR11	1	1	
⑱	E02 127 382	FUSE	F11	1	1	3.15A
⑲	E02 205 381	THERMAL FUSE	F12	1		93℃
	E02 209 381	THERMAL FUSE	F12		1	93℃
⑳	E02 138 383	SURGE ABSORBER	DSAR	1		
	E02 147 383	SURGE ABSORBER	DSAR		1	

13-4. ACCESSORY PART AND REMOTE CONTROLLER

21	E02 611 426	REMOTE CONTROLLER		1	1	
22	E02 527 083	REMOTE CONTROLLER HOLDER		1	1	

MU-C18TV -E1
MU-C24TV -E1

13-5. OUTDOOR UNIT STRUCTURAL PARTS, ELECTRICAL PARTS AND FUNCTIONAL PARTS



Part numbers that are circled are not shown in the illustration.

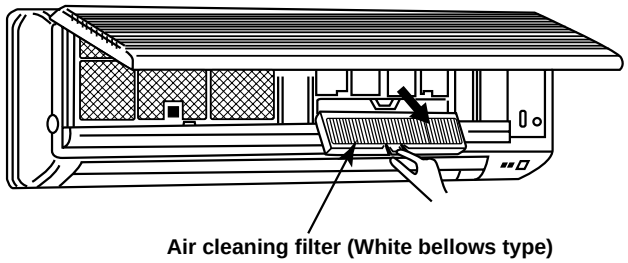
NO.	Part No.	Part Name	Symbol in Wiring Diagram	Q'ty/unit		Remarks
				MU-C18TV - E1	MU-C24TV - E1	
1	E02 140 233	BACK PANEL		1	1	
2	E02 141 232	CABINET		1	1	
3	E02 141 521	GRILLE		1	1	
4	E02 141 501	PROPELLER FAN		1	1	
5	E02 140 515	MOTOR SUPPORT		1		
	E02 139 515	MOTOR SUPPORT			1	
6	E02 138 506	COMPRESSOR RUBBER SET		4	4	4RUBBERS/SET
7	E02 624 900	COMPRESSOR	MC	1		PE-33VPEHT
	E02 517 900	COMPRESSOR	MC		1	NE-47VMHHT
8	E02 217 290	BASE		1		
	E02 176 290	BASE			1	
9	E02 624 661	STOP VALVE(GAS)		1	1	ϕ15.88
10	E02 627 662	STOP VALVE(LIQUID)		1		ϕ 6.35
	E02 625 662	STOP VALVE(LIQUID)			1	ϕ 9.52
11	E02 141 245	SERVICE PANEL		1	1	
12	E02 144 301	OUTDOOR FAN MOTOR	MF	1		RA6V50 -□□
	E02 147 301	OUTDOOR FAN MOTOR	MF		1	RA6V60 -□□
13	E02 217 630	OUTDOOR HEAT EXCHANGER		1		
	E02 147 630	OUTDOOR HEAT EXCHANGER			1	
14	E02 197 374	TERMINAL BLOCK	TB	1		3P
	E02 601 374	TERMINAL BLOCK	TB		1	4P
15	E02 056 374	TERMINAL BLOCK	TB2		1	
16	E02 138 351	OUTDOOR FAN CAPACITOR	C2	1	1	3.0μF/440V
17	E02 082 353	COMPRESSOR CAPACITOR	C1	1	1	50μF/440V
⑱	E02 624 936	CAPILLARY TUBE		1		ϕ3.0×ϕ2.0×850
	E02 625 936	CAPILLARY TUBE			1	ϕ3.0×ϕ2.0×550
⑲	E02 095 382	FUSE	F	1	1	250V/2A
⑳	E02 010 342	COMPRESSOR CONTACTOR	52C		1	
㉑	E02 288 343	FAN MOTOR RELAY	X1		1	
㉒	E02 229 381	THERMOSTAT	26F1		1	
㉓	E02 326 384	CR SURGE ABSORBER	CR		1	

14 OPTIONAL PARTS

14-1. AIR CLEANING FILTER

- AIR CLEANING FILTER removes fine dust of 0.01 micron from air by means of static electricity.
- Normal life of AIR CLEANING FILTER is 4 months. However, when it becomes dirty, replace it as soon as possible.
- Clogged AIR CLEANING FILTER may reduce the air conditioner capacity or cause frost on the air outlet.
- DO NOT reuse AIR CLEANING FILTER even if it is washed.
- DO NOT remove or attach AIR CLEANING FILTER during unit operation.

Model	Part No.
MS-C18TV - E1 MS-C24TV - E1	**MAC-1100FT**

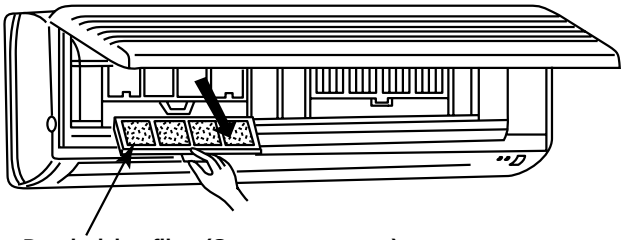


Air cleaning filter (White bellows type)

14-2. DEODORIZING FILTER

- DEODORIZING FILTER removes ammonia and hydrogen sulphide emitted from tobacco, and odor of pets.
- Clean DEODORIZING FILTER every two weeks. If the filter is particularly dirty, clean the filter more often.
- For cleaning, soak the filter in warm water for a while, and then wash and rinse it. Dry the filter in the shade thoroughly.
- When the filter color is still dark even after cleaning, replace the filter with a new one.
  Replace the filter at least once a year.

Model	Part No.
MS-C18TV - E1 MS-C24TV - E1	**MAC-1600DF**



Deodorizing filter (Gray sponge type)

- DEODORIZING FILTER and AIR CLEANING FILTER can be attached on either side.

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